

**CONSTRUCTION AND STANDARDIZATION OF SILENT
READING COMPREHENSION TESTS IN GUJARATI FOR
PUPILS OF CLASSES V, VI AND VII TO STUDY THE
EFFECT OF READING IMPROVEMENT PROGRAMME**

**DR. B. V. PATEL
DR. I. A. VORA**

PRINCIPAL INVESTIGATORS



**DR. B. V. PATEL
PROF. & PRINCIPAL**

**DR. (MISS) K. J. PATEL
SR. RESEARCH FELLOW**

**PROJECT SPONSORED BY NCERT, NEW DELHI
DEPARTMENT OF EDUCATION AND
M. B. PATEL COLLEGE OF EDUCATION
SARDAR PATEL UNIVERSITY
VALLABH VIDYANAGAR
388 120**

ACKNOWLEDGEMENT

In the complex society one has to acquire four socio-linguistic skills as listening, speech, reading and writing to participate in the social interactions actively. Of these four skills listening and speech begin with the early stage of ones childhood. These skills are acquired only by participation in social interactions whereas reading and writing could be acquired through systematic efforts. Most probably in the formal educational set up, these skills are developed. In the formal educational set up the teacher begins with reading skill. It is indeed a crucial task to make a beginner to decipher the responsive written symbols of the language. In our country the decodifying-written-symbol skill has been taught up to the standard IV and thereafter in the formal educational stage no where deliberate efforts are made to help learners to attain further gain in this skill. It is observed that after the first stage of primary education it has been left to the nature. In other words in higher primary classes and onwards no systematic attempts are made by teachers to develop the reading ability of the pupils. As a result of this the pupils pathetically remain poor in the efforts of gaining knowledge of their own in their respective school subjects. Consequently not only they fail to attain higher standards in their academic pursuit, but also a large mass of them leave the school because of their failure even in attaining the minimum level of criterion set for promotion to a higher class. Hence considering reading as a common denominator in learning all school subjects, the school should pay proper attention to the development of reading comprehension in learners. At present in schools there is only the text-book material to be read. It is so meagre that it barely provides any practice in reading and hence they become slow readers. There is a real dearth of Reading Improvement Programme to help the learner to become an accurate and fast reader.

Therefore in the present report an attempt has been made to acquaint the teachers with the reading improvement programme, the construction of the test for measuring reading comprehension levels of the pupils and also how to implement the programme. The impact of reading improvement programme

on reading comprehension and rate of reading is also discussed. The material that is prepared during the course of the project would be useful to the primary school teacher. The two aspects of the investigation namely, the construction and standardization of the reading comprehension tests in Gujarati for pupils of classes V, VI and VII and the preparation of exercises to improve reading comprehension and rate of reading have been included with detail in the report.

The task was felt greater than what it was thought while submitting the scheme to N.C.R.T. Naturally the task demanded help and co-operation of many persons for its implementation and conclusion. We would feel unhappy if we do not express our indebtedness to the persons concerned. We thank :

- N.C.R.T. for financing Rs. 13664/- for this scheme are much pleased to record here the special interest evinced by the officers of I.C.R.T., New Delhi in our work,
- that Vice-Chancellor and Registrar for encouraging us and providing Rs. 3000/- as grant to meet the remaining expenditure of this project
- Dr. (Miss) L.J. Patel a senior research fellow of the scheme who worked enthusiastically till the project was completed,
- students, teachers and students of the schools who were co-operation in conducting the experiments.

. P.V. Patel

I.A. Vora
Principal Investigators

C O N T E N T S

ACKNOWLEDGEMENT	i
LIST OF TABLES	iv
CHAPTER	PAGE
I INTRODUCTION	1
II REVIEW OF THE PAST STUDY /	9
III PLANNING AND PROCEDURE OF CONSTRUCTING THE TEST	20
IV ESTABLISHMENT OF NORMS	39
V RELIABILITY AND VALIDITY	50
VI CONSTRUCTION OF SOCIO-ECONOMIC STATUS SCALE	68
VII READING IMPROVEMENT PROGRAMME	72
VIII EXPERIMENTAL DESIGN	77
IX OBSERVATIONS AND CONCLUSIONS	128
BIBLIOGRAPHY	146

LIST OF TABLES

Sr. No.	Table No.	Particulars	Page
1	3.1	NUMBER OF BOYS AND GIRLS SELECTED FROM CLASS V, VI AND VII FROM RURAL AREA FOR TRYOUT	24
2	3.2	NO OF PUPILS OF CLASS V FROM UPPER AND LOWER GROUP ANSWERING EACH ITEM CORRECTLY, THE DISCRIMINATIVE VALUE AND DIFFICULTY VALUE	27
3	3.3	NO. OF PUPILS OF CLASS VI FROM UPPER AND LOWER GROUP ANSWERING EACH ITEM CORRECTLY, THE DISCRIMINATIVE VALUE, AND DIFFICULTY VALUE	30
4	3.4	NO. OF PUPILS OF CLASS VII FROM UPPER AND LOWER GROUP ANSWERING EACH ITEM CORRECTLY, THEIR DISCRIMINATIVE VALUE AND DIFFICULTY VALUE	33
5	3.5	NO. OF ITEMS SELECTED FROM EACH SUB-TEST, THEIR AVERAGE DIFFICULTY VALUE AND NEW ORDER OF THE TEST FOR READING COMPREHENSION FOR PUPILS OF CLASS V	37
6	3.6	NO. OF ITEMS SELECTED FROM EACH SUB-TEST, THEIR AVERAGE DIFFICULTY VALUE AND NEW ORDER OF THE TEST FOR READING COMPREHENSION FOR PUPILS OF CLASS VI	37
7	3.7	NO. OF ITEMS SELECTED FROM EACH SUB-TEST, THEIR AVERAGE DIFFICULTY VALUE, AND NEW ORDER OF THE TEST FOR READING COMPREHENSION FOR PUPILS OF CLASS VII	38
8	4.1	NO. OF BOYS AND GIRLS DRAWN AS SAMPLE FROM CLASSES V, VI AND VII	41
9	4.2	FREQUENCY DISTRIBUTIONS OF SCORES MADE BY BOYS AND GIRLS OF CLASSES V, VI AND VII ON READING COMPREHENSION TESTS	43
10	4.3	NO. OF BOYS AND GIRLS, THEIR MEAN, SD, MEAN DIFF. AND CR OF CLASSES V, VI AND VII	44

LIST OF TABLES (CONT'D).

Sr. No.	Table No.	Particulars	Page No.
11	4.4	PERCENTILE NORMS FOR PUPILS OF CLASSES V, VI AND VII	44
12	4.5	FREQUENCY DISTRIBUTIONS OF WORDS READ PER MINUTE BY BOYS AND GIRLS OF CLASSES V, VI AND VII	47
13	4.6	NO. OF BOYS AND GIRLS, THEIR MEANS, S.Ds. MEAN DIFFERENCES AND CRs.	48
14	4.7	LETTER RATES (CHAR.) FOR READING SPEED OF PUPILS OF CLASSES V, VI AND VII	49
15	5.1	SCATTER DIAGRAM OF ODD AND EVEN NUMBERED LETTER RATES OF STD. V	51
16	5.2	SCATTER DIAGRAM OF ODD AND EVEN NUMBERED LETTER RATES OF STD. VI	52
17	5.3	SCATTER DIAGRAM OF ODD AND EVEN NUMBERED LETTER RATES OF STD. VII	52
18	5.4	NO. OF ITEMS, ETC., AND S.T. CLASSES V, VI AND VII	54
19	5.5	SUMMARY OF ANALYSIS OF VARIANCE OF TEST FOR CLASS V	55
20	5.6	SUMMARY OF ANALYSIS OF VARIANCE OF TEST FOR CLASS VI	55
21	5.7	SUMMARY OF ANALYSIS OF VARIANCE OF TEST FOR CLASS VII	56
22	5.8	RELIABILITY COEFFICIENTS OF TESTS FOR CLASSES V, VI AND VII AS DETERMINED BY DIFFERENT METHODS	56
23	5.9	COMBINED AND TOTAL NUMBER OF ITEMS FOR EACH TEST IN CLASSES V, VI AND VII	58
24	5.10	SCATTER DIAGRAM OF SCORES MADE BY PUPILS OF CLASS V ON READING, COMPREHENSION AND TEACHING OPINION	60

LIST OF TABLES CONT'D.

Sr. No.	Table No.	Particulars	Page No.
25	5.11	SCATTER DIAGRAM OF SCORES MADE BY PUPILS OF CLASS VI ON READING COMPREHENSION AND TEACHER'S OPINION	60
26	5.12	SCATTER DIAGRAM OF SCORES MADE BY PUPILS OF CLASS VII ON READING COMPREHENSION TEST AND TEACHER'S OPINION	61
27	5.13	CORRELATION MATRIX OF STD. V	62
28	5.14	FIRST RESIDUAL CORRELATION MATRIX A COMPUTATION OF THE SECOND FACTOR LOADING OF STD. V	62
29	5.15	PROPORTION OF VARIANCE CONTRIBUTED BY THE CENTROID FACTORS AND COMMUNALITIES FOR STD. V	63
30	5.16	CORRELATION MATRIX FOR CLASS VI	64
31	5.17	FIRST RESIDUAL CORRELATION MATRIX A COMPUTATION OF THE SECOND FACTOR LOADING OF STD. VI	64
32	5.18	PROPORTION OF VARIANCE CONTRIBUTED BY THE CENTROID FACTORS AND COMMUNALITIES FOR STD. VI	65
33	5.19	CORRELATION MATRIX OF STD. VII	66
34	5.20	FIRST RESIDUAL CORRELATION MATRIX A COMPUTATION OF THE SECOND FACTOR LOADING OF STD. VII	66
35	5.21	PROPORTION OF VARIANCE CONTRIBUTED BY THE CENTROID FACTORS AND COMMUNALITIES FOR STD. VII	67
36	8.1	$\sum X$, $\sum X^2$, N AND \bar{X} ON PRE-TESTING SCORES OF READING COMPREHENSION OF BOTH THE GROUPS OF STD. V	83
37	8.2	SUMMARY OF ANALYSIS OF VARIANCE OF READING COMPREHENSION SCORES OF PRE-TESTING OF EXPERIMENTAL AND CONTROL GROUPS OF STD. V	83

TABLE OF TABLES (CONT'D).

Dr. No.	Particulars	Page No.
30. 5.7	ΣX^2 , N, AND \bar{X} OF PRE-TESTING SCORES ON READING COMPREHENSION OF BOTH THE GROUPS OF STD. VI	84
31. 5.8	DIFFERENCE OF ANALYSIS OF VARIANCE OF READING COMPREHENSION SCORES ON PRE-TESTING OF EXPERIMENTAL AND CONTROL GROUPS OF STD. VI	84
32. 5.9	ΣX , ΣX^2 , N, AND \bar{X} OF PRE-TESTING SCORES OF READ. ING COMPREHENSION OF BOTH THE GROUPS OF STD. VII	85
33. 5.10	SUMMARY OF ANALYSIS OF VARIANCE OF READING COMPREHENSION SCORES ON PRE-TESTING OF EXPERIMENTAL AND CONTROL GROUPS	85
34. 5.11	ΣX , ΣX^2 , N, AND \bar{X} OF PRE-TESTING ON RATE OF READING PER MINUTE OF EXPERIMENTAL AND CONTROL GROUPS OF STUDENTS OF STD. V	86
35. 5.12	SUMMARY OF ANALYSIS OF RATE OF READING PER MINUTE OF BOTH THE GROUPS OF STD. V	87
36. 5.13	ΣX , ΣX^2 , N AND \bar{X} OF PRE-TESTING ON RATE OF READING PER MINUTE OF BOTH THE GROUPS OF STD. VI	87
37. 5.14	SUMMARY OF ANALYSIS OF RATE OF READING PER MINUTE OF BOTH THE GROUPS OF STUDENTS OF STD. VI	88
38. 5.15	ΣX , ΣX^2 OR ΣX^3 OF READING PER MINUTE WITH THE GROUPS OF STUDENTS OF STD. VII	88
39. 5.16	SUMMARY OF ANALYSIS OF RATE OF READING PER MINUTE WITH THE GROUPS OF STUDENTS OF STD. VII	89
40. 5.17	SUMMARY OF ANALYSIS OF CRITERION TESTS AT THE INITIAL STAGE (PRE-TEST) AND FINAL STAGE (POST-TEST) ON READING COMPREHENSION SCORES FOR EXPERIMENTAL AND CONTROL GROUPS OF STD. V	90

LIST OF TABLES CONTD.

Sr. No.	Table No.	Particulars	Page No.
49	8.14	SUMMARY OF SQUARED RAW SCORES AND CROSS PRODUCTS ON READING COMPREHENSION SCORES OF 200 STUDENTS OF STD. V	90
50	8.15	SUMMARY OF ANALYSIS OF COVARIANCE ON READING COMPREHENSION SCORES FOR EXPERIMENTAL AND CONTROL GROUPS OF STD. V	91
51	8.16	SUMS, MEANS AND NS OF CRITERION TESTS AT THE INITIAL STAGE (PRE-TEST) AND FINAL STAGE (POST-TEST) ON READING COMPREHENSION SCORES FOR EXPERIMENTAL AND CONTROL GROUPS OF STD. VI	92
52	8.17	SUMMARY OF SQUARED RAW SCORES AND CROSS PRODUCTS ON READING COMPREHENSION SCORES OF 200 STUDENTS OF STD. VI	92
53	8.18	SUMMARY OF ANALYSIS OF COVARIANCE ON READING COMPREHENSION SCORES FOR EXPERIMENTAL AND CONTROL GROUPS OF STD. VI	93
54	8.19	SUMS, MEANS, AND NS OF CRITERION TESTS AT THE INITIAL STAGE (PRE-TEST) AND THE FINAL STAGE (POST-TEST) ON READING COMPREHENSION SCORES FOR EXPERIMENTAL AND CONTROL GROUPS OF STD. VII	94
55	8.20	SUMMARY OF SQUARED RAW SCORES AND CROSS-PRODUCTS FOR 200 STUDENTS OF STD. VII ON READING COMPREHENSION SCORES	94
56	8.21	SUMMARY OF ANALYSIS OF COVARIANCE OF READING COMPREHENSION SCORES FOR EXPERIMENTAL AND CONTROL GROUPS OF STD. VII	95
57	8.22	SUMS, MEANS AND NS OF CRITERION TESTS AT THE INITIAL STAGE (PRE-TEST) AND THE FINAL STAGE (POST-TEST) ON RATE OF READING (R.R.) FOR THE EXPERIMENTAL AND THE CONTROL GROUPS OF STD. V	96

LITERATURE REVIEW

S. No.	Title	Particulars	Page No.
5	B. 3	SUMMARY OF ANALYSIS OF COVARIANCE ON RATE OF READING FOR 200 STUDENTS OF STD. V ON RATIO OF READING (R.R.)	96
6	B. 24	SUMMARY OF ANALYSIS OF COVARIANCE ON RATE OF READING IN THE STUDENTS OF STD. V OF EXP. MATERIAL AND CONTROL GROUP	97
7	B. 25	ANALYSIS OF COVARIANCE TESTS AT THE INITIAL STAGE (PRE-TEST) AND THE FINAL STAGE (POST-TEST) ON RATE OF READING FOR EXPERIMENTAL AND CONTROL GROUPS OF STD. VI	98
8	B. 26	SUMMARY OF ANALYSIS OF COVARIANCE AND COVARIANCE FOR 200 STUDENTS OF STD. VI ON RATE OF READING (R.R.)	98
9	B. 27	DETAILED ANALYSIS OF COVARIANCE ON RATE OF READING IN THE STUDENTS OF STD. VI OF EXP. MATERIAL AND CONTROL GROUPS	99
10	B. 28	ANALYSIS OF COVARIANCE TESTS AT THE INITIAL STAGE (PRE-TEST) AND THE FINAL STAGE (POST-TEST) ON RATE OF READING FOR THE EXPERIMENTAL AND THE CONTROL GROUPS OF STD. VII	100
11	B. 29	SUMMARY OF ANALYSIS OF COVARIANCE AND COVARIANCE FOR 200 STUDENTS OF STD. VII ON RATE OF READING (R.R.)	100
12	B. 30	SUMMARY OF ANALYSIS OF COVARIANCE ON RATE OF READING IN THE STUDENTS OF STD. VII OF THE EXP. MATERIAL AND THE CONTROL GROUPS	101
13	B. 31	$\Sigma X, \Sigma X^2, \Sigma XY$ AND OBSERVATIONS ON SCORES OF READING COMPETITION ABILITY OF FOUR STUDENTS RELATED TO LEVELS OF TREATMENT (A) AND (B) IN STD. V	103

LIST OF TABLES CONTD.

Sr. No.	Table No.	Particulars	Page No.
67	8.32	SUMMARY OF MULTI-WAY ANALYSIS OF VARIANCE OF READING COMPREHENSION SCORES OF PUPILS OF STD. V	
68	8.33	SUMMARY OF DUNCAN'S NEW MULTIPLE RANGE TEST SHOWING COMPARISON OF MEANS OF READING COMPREHENSION ABILITIES OF STUDENTS OF STD. V OF FOUR GROUPS	105
69	8.34	ΣX , ΣX^2 , \bar{X} AND n ON OBSERVATIONS ON THE SCORES OF READING COMPREHENSION ABILITIES OF FOUR GROUPS FORMED ON TWO LEVELS OF TREATMENT (A) AND SES (B) OF STD. VI	107
70	8.35	SUMMARY OF MULTI-WAY ANALYSIS OF VARIANCE OF READING COMPREHENSION SCORES OF PUPILS OF STD. VI	108
71	8.36	SUMMARY OF DUNCAN'S NEW MULTIPLE RANGE TEST SHOWING COMPARISON OF MEANS OF READING COMPREHENSION ABILITIES OF FOUR GROUPS OF STUDENTS OF STD. VI	109
72	8.37	ΣX , ΣX^2 , \bar{X} AND n ON OBSERVATIONS ON THE SCORES OF READING COMPREHENSION ABILITIES OF FOUR GROUPS FORMED ON TWO LEVELS OF TREATMENT (A) AND SES (B) OF STD. VII	111
73	8.38	SUMMARY OF MULTI-WAY ANALYSIS OF VARIANCE OF READING COMPREHENSION SCORES OF PUPILS OF STD. VII	112
74	8.39	SUMMARY OF DUNCAN'S NEW MULTIPLE RANGE TEST SHOWING COMPARISON OF MEANS OF READING COMPREHENSION ABILITIES OF FOUR GROUPS OF STUDENTS OF STD. VII	113
75	8.40	ΣX , ΣX^2 , \bar{X} AND N OF OBSERVATIONS ON THE RATE OF READING PER MINUTE OF FOUR GROUPS FORMED ON TWO LEVELS OF TREATMENT (A) AND SES (B) OF PUPILS OF STD. V	116

TABLE OF CONTENTS.

1. Folio No.	Particulars	Page No.
1.	8.41 SUMMARY OF MULTIL-WAY ANALYSIS OF VARIANCE OF LEVELIMENT OF RATE OF READING PER MINUTE OF PUPILS OF STD. V	117
2.	8.42 SUMMARY OF LEHMAN'S NEW MULTIPLE RANGE TEST SHOWING COMPARISON OF MEANS OF RATE OF READING PER MINUTE OF FOUR GROUPS OF STANDARD OF STD. V	118
3.	8.43 Σx , Σx^2 , \bar{x} AND N ON OBSERVATIONS OF THE RATE OF READING PER MINUTE OF FOUR GROUPS FORMED ON THE BASIS OF TWO LEVELS OF TREATMENT (A) AND (B) OF STUDENTS OF STD. VI	120
4.	8.44 SUMMARY OF MULTIL-WAY ANALYSIS OF VARIANCE OF LEVELIMENT OF RATE OF READING PER MINUTE OF STD. VI	121
5.	8.45 SUMMARY OF LEHMAN'S NEW MULTIPLE RANGE TEST SHOWING COMPARISON OF MEANS OF RATE OF READING PER MINUTE OF FOUR GROUPS OF STANDARD OF STD. VI	122
6.	8.46 Σx , Σx^2 , \bar{x} AND N ON OBSERVATIONS OF RATE OF READING PER MINUTE OF FOUR GROUPS FORMED ON THE BASIS OF TWO LEVELS OF TREATMENT (A) AND Seri (B) OF STUDENTS OF STD. VII	124
7.	8.47 SUMMARY OF MULTIL-WAY ANALYSIS OF VARIANCE OF LEVELIMENT OF RATE OF READING PER MINUTE OF STUDENTS OF STD. VII	125
8.	8.48 SUMMARY OF LEHMAN'S NEW MULTIPLE RANGE TEST SHOWING COMPARISON OF MEANS OF RATE OF READING PER MINUTE OF FOUR GROUPS OF STUDENTS OF STD. VII	126

CHAPTER I

INTRODUCTION

It is the common experience of all people concerned with education that the standard of education is deteriorating day by day. This fact is generally revealed by studying the results of the public examinations like Secondary School Certificate Examination and Higher Secondary School Certificate Examination. The failure at the public examinations and internal examinations at different grades have made the problem of wastage and stagnation a grave one. There may be various reasons for this colossal wastage and stagnation but the striking one is probably the poor reading ability of the students. It is the common feeling of most of the people that the lack of proper and systematic methods of teaching reading right from the Class I of primary schools to Class X of secondary school could be considered as one of the chief reasons for the poor reading ability. This feeling is supported by the findings of Thorndike. He carried out a survey of reading comprehension education in fifteen countries by taking a sample of two age groups namely 10 years and 16 years. The pupils of both the age groups of our country are found to be poorer in reading comprehension in comparison to other countries. This also points out that the position of teaching reading is not very satisfactory in our country. Besides this, it will be worthwhile to look into the importance of reading in day to day life and as a tool of learning.

1.1 Importance of Reading

Listening, speaking, reading and writing are the four fundamental skills of communication. Out of these listening and reading are receptive skills while the remaining two are expressive skills. These skills are to be developed through the teaching of languages. It is through these skills that the learning of other school subjects becomes possible. Hence much emphasis must be given to the acquisition and development of these skills.

It is through reading that one gets knowledge and information. Through reading, the individual remains abreast of the continuous expansion of knowledge in his or her field of work. Therefore the importance of good reading cannot be understated. Besides this, in this knowledge explosion age, if one wants to keep oneself abreast of the latest development one should cultivate good reading comprehension. The good reading comprehension does not make oneself only conversant with latest information but it also prevents oneself from becoming intellectually static and regressive. Gray and Horner have expressed the thought well as under :

"It is an indispensable factor in modern life, interwoven with work, recreation and other activities of young people and adults. Its great value lies in two facts : printed materials provide the most illuminating and varied records of human experience that are now available, and they can be examined and restudied at time and again at the reader's convenience... Some of these values cannot be attained so effectively through other media because the individual is not free to pause and reflect patiently."

Moreover reading can also be considered as one of the major and important tool of communication, essential for the existence in the complex system of social arrangements. The importance of reading has also been pointed out by John J. DeBoer in his views :

"If all the inventions of hundred years were destroyed and only books were left, man could still be man in the sense intended by the idealists, the poets, the great creators".²

-
1. Gray Williams and Horner Bernice, *Maturity in Reading*, Chicago : The University of Chicago Press, 1956, p. 8.
 2. John J. DeBoer and Martha Dallmann, *The Teaching of Reading*, New York : Rinehart and Winston Inc., 1964, p. 4.

From this discussion it could be said that the importance of reading cannot be underestimated from the view point of day to day life.

1.2 Reading as a Tool of Learning

We can get knowledge by reading. Some one has rightly said, "If knowledge is a locked palace, reading is the key to open it". In other words it could be said that reading is the common denominator in learning all school subjects. Thus it has been considered to be an important tool of widening the horizon of knowledge and understanding.

"Some educators, in fact, refer to reading as one of the 'tool' subject. There is a common notion that a child acquire this tool-reading in elementary school and from there onwards uses it in all areas of the curriculum".³

Therefore if a person is not able to read properly he cannot comprehend what he has read. If there is no comprehension there is no reading.

"A text book is the beginning and the end of learning so long as the school text book is the prime medium of learning, attention must be paid to the fact that the learner's ability to read the text-book must be good".⁴

From this discussion it could be said that reading is the king pin in the learning process. Also it becomes clear that without proper reading ability one cannot understand school subjects.

3. Robert C. Aukerman. Reading in the Secondary Classroom. New York : McGraw Hill Book Company, 1972 p. 325.

4. Ibid., p. 2.

1.2 Prerequisite of Teaching Reading

In the foregoing paragraphs, the importance of reading as an essential means of acquiring the understanding of the surrounding world as well as an important tool of learning has been discussed. Though reading is the backbone of learning process and is the fundamental tool of acquiring knowledge used in the class room as well as in the life, it is by and large a neglected area in our country. It is now high time to emphasize and develop this skill from the beginning of the formal education and be continued at all stages of education. However in this connection it is really very regretful to note that no sincere, systematic and scientific attempts are being made to develop this skill at any grade and level of education. The growth and development of this skill is mostly left to nature after making beginning and putting some efforts in the early years of primary schools. Besides this, in most of our schools, efforts are made to teach the content of language rather than to teach and develop the skills of reading comprehension. Secondly the students largely depend upon the class room notes given by teachers, which generally lack in new information in the subjects. The main reasons that can be attributed to this situation is equipping the students with proper reading skills. Especially at the primary stage of schooling, the teaching of reading is mostly half heartedly done and the approach may not be scientific, too. Thus the attempts that are made for developing reading skill may cause a lot of damage to the academic achievement as well as to the personality of the students. The students pass their successive standards with poor scholastic records at their credit. This is indeed a dismal picture of the present state of affairs in the field of reading at all levels of education.

In order to improve this situation an attempt should be made to improve reading from the primary school stage and gradually it should be taken to the secondary education also.

From the above discussion one can conclude that in the modern complex society, in the formal education and thereafter

in practical life situations. One heavily depends on reading skill to keep himself continuously abreast of the latest development in the areas of his specialisation in specific and other significant social events taking place around in general. It is more often found that an under-developed skill operator finds his work often drudgery and thereby develops a tendency to withdraw himself from such situations and feels himself without any vigour and becomes often psychologically dependent. Hence it is the demand of the day to make today's learners a better reader i.e. reading with full comprehension and also to read with speed is fast as he could. For this there is a dire need of developing reading improvement programmes to develop rate of reading and Reading Comprehension for primary as well as secondary school stages.

It is, therefore, in this context that the present problem in the area of reading has been taken up with a view to developing a Reading Improvement Programme.

1.4 Statement of the Problem

Construction and standardization silent reading comprehension test in Gujarati for pupils of classes V, VI and VII and to study the effect of exercises for improving Reading Comprehension (RIC).

1.5 Definitions of Terms

Reading Comprehension : Reading comprehension has been defined by different authors in different ways. Edward L. Fry has defined reading comprehension as follows :

"According to it, simple concepts, it might be said, that comprehension is a part of the communication process of carrying the thoughts that were in the author's mind into the reader's mind".⁵

It means understanding of words in the context, understanding of significant details and grasping of concepts that are given in the reading material. The comprehension could be measured by assigning scores for the performance of the students on reading comprehension test.

1.6 Selection of Classes V, VI and VII

In Gujarat, the child is admitted in Class I of primary school at the age of six. According to the new pattern of education classes from I to VII are grouped under primary education. The classes from VIII to X are grouped under secondary education while classes XI and XII are grouped under higher secondary education. Therefore the child has to remain in primary school for seven years which is the longest period of all stages of education. It is in the primary stage that the child is taught reading from class I and attempts are continued upto class IV. Thereafter the development of reading ability is left to nature. Hence it was thought that classes V, VI and VII be selected for improving the reading comprehension of pupil. It is also thought that a reading programme for pupils of classes V, VI and VII be made available to primary school teachers for their future use.

1.7 Objectives

1. To prepare reliable and valid tools for measuring reading comprehension in Gujarati for pupils of Classes V, VI and VII separately.
2. To establish norms for speed and reading comprehension in Gujarati for pupils of classes V, VI and VII.

5. Edward L. Fry. Teaching Faster Reading. Cambridge University Press, London : 1963, p. 24.

3. To prepare and provide programmes for developing reading speed and comprehension for pupils of classes V, VI and VII.
4. To study sex differences with regard to reading speed and comprehension.
5. To study whether there are any mean differences in reading speed and comprehension between pupils coming from different socio-economic status.
6. To provide primary schools with valid and reliable tools for measuring reading speed and comprehension for the pupils of classes V, VI and VII.

1.8 Limitations of the Study

The study is confined to classes V, VI and VII of primary sections attached to secondary schools of Kheda District. The schools are selected from Anand Taluka only. Further the study is confined to Gujarati medium schools. The scores obtained by pupils on the test constructed and standardized by principal investigators keeping in view the components of reading comprehension have been treated as reading comprehension score.

Number of words read per minute in the first sub-test of every test have been considered as the rate of reading per minute (R.R. p.m.)

The scores obtained on SE Scale, constructed by the investigators have been used to divide the sample into convenient levels of SES to measure its effect on Reading Comprehension and Rate of Reading per minute.

1.9 Scheme of Chapterization

The second chapter deals with the review of the past work done in the area of reading improvement. The chapter describes the review of work done in abroad and in India.

The third chapter describes the preparation of the tests to measure reading comprehension, selection of reading material, selection of items, and editing the pilot form of the tests. It also deals with the experimental try out of the test, procedure of item analysis and criteria for selecting the items for the final form of the tests.

In the fourth chapter the establishment of norms have been discussed and reported.

In the fifth chapter the reliability and validity of the tests have been reported.

The sixth chapter deals with the construction of the socio-economic scale and its scoring key in detail.

The seventh chapter describes the preparation of the reading improvement programmes in which the selection of reading material, building vocabulary, improving word recognition span, improving sentence comprehension and paragraph comprehension have been discussed at length.

The eighth chapter deals with the experiment carried out to study the impact of Reading Improvement Programme on the development of Reading Comprehension and in the increase of Rate of Reading per minute.

It also deals with the statistical techniques, analysis of the data and interpretation of results. Besides this, the impact of Reading Improvement Programme has also been studied in the context of all and it is discussed in this chapter. Thus this chapter is the crux of the research report.

The ninth chapter deals with the observation and conclusion together with the suggestions for further research in this area.

In short the body of research report contains the full details of the account of the different steps taken to complete the research.

CHAPTER II

REVIEW OF THE PAST WORK

The review of the past researches is an important step in the process of research because it helps the investigator in preparing his/her own research design. At the same time it also gives the idea of the limitations of tools and procedure used by the past investigators. Besides this it also helps to develop confidence in the researcher to shoulder the burden of the research project. With these objectives in mind the review of the past work done in the area of measurement of reading and programmes for improving reading have been done.

Measurement of Reading

The measurement of silent reading has been classified into two categories :

- i. Measurement of eye movement by photographs.
- ii. Measurement through paper-pencil test, which is largely used in schools and colleges.

Here the measurement of reading through paper-pencil tests have been described. The teacher can evaluate reading comprehension by two methods. They are :

- i. Informal way of evaluating reading comprehension and
- ii. Formal way of evaluating reading comprehension with the help of standardized tests.

1. Informal Way

The informal way of evaluating reading comprehension by and large depends upon the method of observation. In this procedure the teacher while teaching, asks the pupils to read silently the reading material and then asks the relevant and proper questions to find out the level of comprehension of the pupils by analysing the answers given by the pupils. Through this method the teacher can gather some crude impression

about the level of reading comprehension of pupils. But here also the judgment of a reasonably competent and seasoned teacher could be considered as reasonably dependable and true.

From this it becomes clear that the teacher forms the general impression of the pupil's reading comprehension. However it is not easy to analyse and evaluate pupil's level of reading comprehension by merely depending on observation. It is for this reason that this method is considered to be less reliable and valid, but it could be said that this method has certainly provided a background to find out the behavioural specifications of reading comprehension on which the valid and reliable tests have been constructed and standardized for the use of primary and secondary schools.

III. Formal Way (Standardized Test)

In the informal way due to incompetencies or subjectivity on the teacher it may be possible to underestimate or overestimate the child's reading comprehension. Therefore to check the teacher's judgment, a scientific tool came into existence, namely 'Reading Ability Test' or 'Reading Comprehension Test'. Therefore at present, the teachers are utilizing the standardized tests for measuring the reading comprehension of the students. Consequently here an attempt is made to give the review of some available tests of reading comprehension developed in foreign countries and in India.

1. U.S. Reading Comprehension

The following tests on reading have been reviewed with an objective of finding out abilities or skills measured by them. Therefore the tests have been studied keeping in view the following points.

- * Abilities or skills measured by the test.
- * Type of scores they give
- * Norms.
- * Time required to administer the test

- * Type of questions
- * Reliability and validity

The review of the tests have been given in two parts, namely (i) Tests of reading standardized in foreign countries and (ii) Tests of reading standardized in India.

Test on Reading Standardized in Foreign Countries

- I Iowa Everett Pupil Tests of Basic Skill¹
Test A for elementary, graded 3-5 : advanced, grade 5-9.
It is a silent reading comprehension test battery measuring skills developed in elementary schools.

Paragraph comprehension, noting details, organization of ideas and grasping the total meaning are the four silent reading skills that are measured through this test. It also measures vocabulary. There are five questions having four multiple choice under each story or a small paragraph. The advance battery is parallel to the elementary battery in abilities measured. The questions are also similar in nature. The reading material used is longer but interesting and consists of description and exposition of historical narration.

There are 40 items in the elementary battery and 50 in advanced battery. The total time required to administer the test is 70 minutes. The grade and age equivalents together with grade percentile norms are given. Answers are to be marked on separate answer-sheet. Nothing has been mentioned about the reliability of the test in the mental measurement year book.

II The Nelson Reading Test²

This test is meant for grade 3-9. The test also includes vocabulary and paragraph comprehension test.

-
1. Oscar Krisen Buros (Ed.) The Sixth Mental Measurements Year Book. New Jersey : The Gryphon Press, 1965, pp. 793-1066.
 2. Ibid., pp. 800-1077.

The test consists of vocabulary test of 100 words and 25 paragraphs, measuring three different skills of comprehension. They are the skill to note the general significance, skill to note the details and to draw inferences. The percentile and grade norms for vocabulary, for paragraph comprehension and total scores have been reported. The reliability coefficient is about 0.90 and the validity coefficient is about 0.80 which were found out by comparing the score on available reading comprehension test. The time allowance for part I of the test that is vocabulary is of 10 minutes and for part II it is of 20 minutes.

III Gates Reading Survey³: Test for grade 3 to 10

The test measures speed and accuracy, reading vocabulary, and level of comprehension. There are three sub-tests in the test. The first is speed and accuracy test having 36 test items and second is reading vocabulary test having 60 test items and the third is comprehension test having 43 items.

The test gives three different scores. The grade and percentile norms for each score are given. The reliability coefficients for five different grade range from 0.82 to as high as 0.89.

The time allowance for the first test is 6 minutes for grade 3-4-5 and 4 minutes for grade 6 to 10. For second and the third sub-tests the time to be given for each sub-test is of 20 minutes.

Test in Reading in India

In India few persons have tried to construct and standardize the test in this area. Some of them are reviewed here:

I V... Javli⁴ constructed a test to measure the linguistic ability of primary school children in 1940. The test measures

3. Itid., pp. 793-1066,

4. A.B. Buch (Ed.) A Survey of Research in Education, Baroda : Caba, Faculty of Education & Psychology, M.S. University, 1974. pp. 287-297.

vocabulary, level of comprehension, speed in reading and accuracy in writing. It is meant for Class III to VIII. It can be used as diagnostic test. Grade norms are given and they are applicable to schools in urban area only.

II The Silent Reading Ability Test in Gujarati.

This test has been constructed and standardized by Bhagatwala⁵ in 1966 for his doctoral degree of M.S. University, Baroda. The test is meant for Stds. VIII to XI. The test aims at measuring speed of reading, word meaning and comprehension. The sex-wise percentile norms for each grade and age are given.

The reliability coefficients determined by test-retest method, split-half and parallel form are found to be ranging between 0.50 to 0.98. The validity coefficients have been determined by correlating the scores of the test with teacher's opinion and with standard scores of the marks obtained by pupils in subjects other than English. It is ranging between .70 to .80.

III Reading Ability Test in Gujarati constructed by R.S. Trivedi and B.V. Patel⁶ for classes VIII to X. The authors have given class-wise standard scores, percentile norms and rate of reading. They have also given percentile norms with letter grade norms. The test measures the following components of reading comprehension.

1. Ability to note the significant details.
2. Ability to give the meaning of the words, proverbs and idioms.
3. Ability to grasp the central idea.
4. Ability to find out the relationship of ideas
5. Ability to read tables.
6. Ability to draw generalization.

-
5. J.A. Bhagatwala. Standardization of Silent Reading Tests in Gujarati for Secondary Schools. Baroda : M.S. University of Baroda, 1966.
 6. R.S. Trivedi and B.V. Patel. Vachan Shaktini Kasoti, Ahmedabad : Balgovind Kuberdas and Co., 1967-68.

It also measures the reading speed of the students.

IV Silent Reading Comprehension Test in English for S.S.C. Pupils of Gujarat State, constructed by B.V. Patel⁷ for his doctoral degree of Saurashtra University, Vallabh Vidyanagar. The test consists of nine sub-tests which aim at measuring the following components.

1. Ability to note the significant details.
2. Ability to find out the relationship of ideas.
3. Ability to give the meaning of the words in context.
4. Ability to give the central idea of what is read.
5. Ability to read the map and table.

Thus the battery appears to be elaborate enough to measure the reading comprehension. Sex-wise and area-wise percentile norms are given. The reliability coefficients of sub-tests are ranging from as low as 0.40 to as high as 0.91. The reliability coefficient of the whole test is between 0.91 to 0.96. The concurrent validity coefficient is 0.47 and the total time to be allowed to answer the whole test is of 76 minutes.

V B.U. Parekh⁸ construction and standardization of a silent reading test in Gujarati for pupils studying in Std. IX in Gujarat. Ph.D. Education, Saurashtra University, 1973.

The test has nine sub-tests in respect of reading rate, prose comprehension, directed reading, poetry comprehension, paragraph comprehension, word meaning, sentence meaning, proverbs and idioms and table reading.

The reliability coefficients of the test have been estimated by four different methods. It is ranging between 0.64 to 0.97. The validity of the test has also been found out by correlating the test score with some renowned tests available in market. The inter correlations of the sub-tests with the whole test are of a fair order. The grade norms,

-
7. B.V. Patel. Construction and Standardization of a Silent Reading Comprehension Test in English for S.S.C. Pupils of Gujarat State, Ph.D. Thesis, S.P.University, 1971.
 8. B.U. Parekh. Construction and Standardization of a Silent Reading Test in Gujarati for pupils of Std. IX in Gujarat. Ph.D. Edn. Thesis, Sru. Uni., 1973.

percentile norms, standard score norms and stanine scores are found out for boys and girls and for the whole group. The time required to answer the test is of 76 minutes.

After this, it is thought to have review of reading improvement programme in Gujarati but it is quite surprising to note that there is not a single programme in Gujarati for improving reading comprehension. Therefore here an attempt is made to review some of the studies carried out in foreign countries and also done in India in other languages.

Review of Studies in the Area of Improving Reading Comprehension

It is a fact that has been established in the reading centres of hundreds of colleges and universities throughout the world that reading comprehension could be improved to a reasonable extent. This is revealed by reviewing the following studies.

(I) Teaching Reading to College Students and Adults.⁹

The comprehension and rate gain of 109 college students were measured by Carpenter and Jones to assess the impact of reading laboratory classes on reading achievement using a sequential individualized approach. The reading course emphasized the skill areas of comprehension, vocabulary and rate over 6 to 8 week duration after which application of acquired skills was encouraged to text books and journals. Achievement gains of students within the reading classes for spring and fall semesters were determined by difference between initial and end of year percentile scores on the Nelson Denny Reading Test. The mean percentile rank for comprehension increased from 42 to 61 and the mean rate increased from 255 words per minute to 515.

(II) Shrauger¹⁰ evaluated a personalized reading instructional programme in a conventional classroom at a community college. The aim of the programme was to teach students how to learn, to

9. Carpenter and Jones. Teaching Reading College Students and Adults. *Reading Research Quarterly*. IRA, No. 3. Vol. XII. 75-76, Summary of Investigations Relating to Reading. July 1, 1975 to June 20, 1976. p. 434.

10. Ibid., pp. 434-35.

direct their own learning and to improve their reading and vocabulary skills. A variety of data were collected at the start of the programme including vocabulary and reading scores on the McGraw Hill Basic Skill Test. Taped programme text, practice exercises, mechanical aids and based programmes were employed as learning material to improve vocabulary and reading skills. Activity progress and records were maintained by each student with the use of a 'Family' folder. After 1 semester result analysis of pre-test and post-test scores of students in 4 classes showed positive gains in the reading areas of vocabulary and comprehension.

(III) Migrant Tutorial Reading Programme by Symula¹¹

The reading achievement of 250 migrant children was examined by Symula in a report of a migrant tutorial reading programme founded by the Bureau of Migrant Education. In this programme, tutors were trained to work with migrant children in schools. Each child, depending upon age was tutored from half an hour to an hour a day, 5 days a week. Each tutor worked with 4 children an hour. A commercial reading programme was used as the basic tutorial system. Pre-test and post-test were administered by using Spache Diagnostic Reading Scale to measure achievement of the subjects. The average gain in reading was 1.4 years for the school year of tutoring.

(IV) A Pilot Training Programme at Purdue University.¹²

At Purdue University a pilot training programme was offered to 307 entering freshmen, and by the fifteenth week as reported by professors Russell Cooper and Barriss Mills in the Journal of Higher Education, members of this group increased their speed by 62 per cent.

Another group of 282 freshmen, similar in general and reading abilities to those enrolled in training but pursuing

11. Ibid., p. 444.

12. Lewis Norman, How to Read Better and Faster, New York : Thomas Y. Crowell, Harper and Row Publishers, 1978. p. 3.

only the regular course of studies made a gain of 9% over the same period. Professor Cosper and Mills drew these very significant conclusions from a comparison between training and non-training.

In general, results showed that reading ability improves very slowly, if at all, in the conventional course of study. By working directly on reading skill, it is possible to increase decidedly the rate at which a student can grasp the content of the printed page.

Work done in India

It will not be out of place if review of researches done in this area in India is given a place here.

(I) K.R. Narayan Swami's¹³ Research (1969) on reading comprehension at the college level had three objectives.

1. to measure the reading skill of pre-university class-students,
- ii. to improve their reading skill,
- iii. to suggest measures for improvement of the reading ability of students at the level in general.

The experiment was conducted on six groups consisting of 167 students. They used the Fry Reading Course : Reading Faster (1963) and the speeded reading techniques advocated by him. The course was found effective both in terms of improvement of comprehension and increase in speed only with two of the experimental groups. In the case of third group the gains in both in speed and comprehension were insignificant. An intensive course in remedial reading was devised for improving the reading rates and comprehension. The important findings were :

- i. It is possible to improve the reading of school leavers through reading alone irrespective of the proficiency in other language skill.

13. M.B. Buch (Ed.) Op. cit., pp. 283-283.

- ii. Very few of the school leavers respond to a short term course in reading like the Fry's.
 - iii. Reading comprehension should be improved in the school.
- (II) The Improvement of Reading Efficiency - Ansuya K. Narayanwadi. 1970. Panjab University.¹⁴

The main aim of Ansuya's investigation was to improve the reading efficiency of the PUC level and to establish criteria for the improvement of reading efficiency of pre-university students. The research was conducted on a sample of 400 students from PU. They met in five groups. After the initial test the students were given reading material on the value reading, the elements of reading skill and common faults in reading and how to eliminate them. They were then given Edward Fry's test in succession. The results revealed that the reading efficiency of all the groups increased considerably.

Both the studies thus revealed that there is a considerable scope for improvement in the skill and same could be attained through appropriate material.

- (III) Development of Course for Increasing the Reading Proficiency in English of the Post High School Students of Gujarat by Girish H. Kotak.¹⁵

Objectives of the research were as follows :

- i. To select the components of reading in English as a foreign language relevant to the post high school stage.
- ii. To prepare and try out auto instructional materials for developing proficiency in each component and in the act of reading as a whole.
- iii. To prepare pre and post tests for evaluating the outcomes of different units in the course.

14. Ibid., p. 270.

15. Girish H. Kotak. Construction of a Course for Increasing the Reading Proficiency of the Post High School Students of Gujarat. Unpublished Doctoral Thesis in Education, Gujarat University, 1982.

- iv. To prepare pre and post tests for evaluating the outcomes of the course as a whole.
- v. To fix the range of applicability of the course in terms of marks obtained by learners in English at the new S.B.C. Examination.
- vi. To study the reaction of the pupils regarding the course.

The sample consisted of 233 students selected from higher secondary schools of Ahmedabad city. The course consists of 10 units. The units are in the form of self study course book Unit A.

- i. Word recognition.
- ii. Word meaning-known words.
- iii. Meaning of unfamiliar words use of context.
- iv. Reading meaningful phrases.
- v. Sentence meaning.
- vi. Finding out the main idea.

Unit B.

- i. Formation of words.
- ii. Dictionary skills.
- iii. Guided reading.
- iv. Speed reading with comprehension

The study revealed that the course providing training in different components of reading and then giving integrated practice in reading as such has been highly effective in developing the reading efficiency of the students. Unit-wise exercises based on different skills have proved to be effective in case of low achievers and in case of high achievers unit-wise exercises have not proved equally effective.

Thus the review of the related literature helped the investigators in deciding the components of reading comprehension to be measured in Gujarati for pupils of classes V, VI and VII. It also helped to decide points to be considered while preparing reading improvement programme.

CHAPTER III

PLANNING AND PROCEDURE OF CONSTRUCTING THE TEST

Planning is an essential step in the process of test construction, without which the satisfactory measuring instrument would not be possible. Good test construction is a time consuming process. The planning of the test involves the spelling out of the specifications of the mental trait or the ability to be measured, the content through which the trait or ability to be measured, types of questions to be used, arrangement of sub-tests, length of the test and so on. Therefore the first and the foremost task was to spell out the behaviour specification of the term "reading comprehension".

The study of the review of some tests on reading indicate that the reading comprehension is an understanding of the material read and is composed of different components or skills. The various components of reading comprehension as revealed by the review of some tests are described below.

The student who is good at reading comprehension is able to :

- give significant details of what is read
- find out the relationship of ideas expressed in the reading material
- give the meaning of the words and phrases
- draw generalization,
- give the main idea of what is read
- give the option of what is read
- draw inferences
- give the sequence of events or ideas

Thus after threshing out the components, the next task was to decide the number of components to be covered through the test. This was done keeping in view the age and grade of the students. For this the experienced teachers and method writer in Gujrati were consulted for finalising the components of reading comprehension, which could be measured objectively through paper-pencil test. The discussion of components was

done through the seminar organised under the auspices of Extension Services Centre of M.B. Patel College of Education. As a result of the discussion with teachers and method masters following components were finalised for constructing the reading comprehension test in Gujarati for pupils of classes V, VI and VII.

After finalising the components, the major task was to select the reading material and coin the test items through which the following components could be measured .

- Give significant details.
- Give meaning of the words and phrases.
- Give the sequence of events or ideas
- Give the caption of the paragraph that he has read and draw generalization.

Selection of the Reading Material

In order to select the reading material and coin test items, a workshop was organised for teachers teaching Gujarati in classes V, VI and VII under the auspices of Extension Services Centre, M.B. Patel College of Education. Certain criteria for the selection of the reading materials were formulated. Accordingly the following criteria for the selection of reading material were formulated and given to teachers participating in the workshop.

(i) Language, because of its important role in reading comprehension, must be within the reach of the pupils for whom the tests are to be constructed. Here 'Language' means language material i.e. sentence patterns, vocabulary etc.

(ii) Phrases and sentence construction : Certain phrases, idioms and other dialectical word which create difficulty in comprehension of the average pupils are to be deleted from the passages and substituted by easier words and phrases. Whenever possible the long and clumsy sentence construction such as complex sentences be made shorter and simple looking to the level of understanding of the average pupils.

(iii) Interest is the potent factor in reading hence stories, events or paragraphs be selected in such a way that the interest of pupils could be maintained. The teacher in the seminar selected the material according to these criteria. After selecting the ample materials, the next step was to construct the test items. It was decided to construct the multiple choice type of items except, the items testing the sequence of events. The items were then screened with the help of method master and principal investigator.

Preparation of Item

As said earlier that it was decided to construct the multiple choice type of items for testing the components of reading comprehension. Items were prepared more than what would be required in the final form of the test. The items thus prepared by teachers teaching Gujarati in classes V, VI and VII were screened by a committee of experts consisting of principal investigators, method masters in Gujarati and even fellow who were conversant with the preparation of framing objective type questions. The items were screened keeping in view the component of reading comprehension mentioned earlier in this report. In all 100, 98 and 113 test items were screened and finalised for the pilot form of the reading comprehension test for classes V, VI and VII respectively.

Preparation of Pilot Form of the Test

Editing the pilot form of test was made keeping in view the following points.

Selected items be arranged according to the expected difficulty level.

One type of items be grouped together.

Accordingly in every sub-test the multiple choice type of items were put together and they were first arranged (before trial) according to the sequence of the content of passage or story. The items testing the ability to give the sequence of events or ideas presented were kept at the end. After arranging the items in this way, the pilot form of the tests

were got cyclostyled. Looking to the age and grade of the pupils it was decided not to give separate answer sheet. 200 copies of each test for each class were got cyclostyled.

Experimental Try out

After preparing the test according to the plan, it is always subjected to experimental try out because no matter how carefully the test content is planned or how expertly the test items are prepared. There is no guarantee that the items would actually 'behave' the way they are expected to.¹ Therefore try out is considered to be a very important step in the process of test construction and standardization. From this quotation it can also be inferred that try out of a test has certain objectives such as :

1. to identify weak or defective items, more specifically to find out the ambiguous items,
2. to determine the difficulty value of each item in order to arrange them according to difficulty values,
3. to determine the discriminative value of each item in order that all items selected may contribute to the main purpose of the finished test,
4. to find out the appropriate time limits that would be required to administer the final form of the test,
5. to study the efficacy of the instructions to be given to examinees and examiners.

The try out was planned with these objectives in mind.

Besides this, the sample for tryout should be representative of the population to whom the final form is to be administered. As it was decided to standardize a test for rural area schools from rural area were selected at random. In the sample only mixed schools were selected. The sample for try out form is shown in table 3.1.

1. Educational Testing Services, ETS Builds a Test, Princeton, ETS, 1959, p. 12.

Table 3.1
NUMBER OF BOYS AND GIRLS SELECTED FROM CLASS
V, VI AND VII FROM RURAL AREA FOR TRYOUT

Std.	Boys	Girls	Total
V	146	54	200
VI	142	56	200
VII	148	52	200

Administration and Scoring of the Tests

After deciding the sample, the research fellow herself went to schools for the purpose of administering the test. Previous permission for allowing the research fellow to administer the tests were sought. The research fellow first of all explained the students the purpose of the tests and nature of the tests through informal talk with a view to establishing the rapport. After this, the test booklets were distributed and pupils were told not to open the booklet until they are told to do so. After distributing the booklets, the students were asked to fill in particulars such as name, village and school on the front page of the booklet. The research fellow then told the students to read the instructions on the front page alone, with her - that is, she told that she would read the instructions aloud and they would read the instructions silently with her. As the first test aims at measuring the reading speed the students were told to start reading at the signal 'start' and after one minute they were told to stop reading. The students were asked to draw a vertical line to show the amount of material read in one minute. After this the students were asked to read and answer the questions of each document, liberal time was given to read and answer the questions as the purpose of the administration was to find out the discriminative values and difficulty values of the item. It was observed that quite a few students took about seventy minutes to answer the questions.

After administering the tests, the next task was to score the tests according to the predetermined scoring keys. The scoring was done manually. While scoring incomplete test booklets were excluded from the number of test booklets.

Item Analysis

The item analysis of the test gives two kinds of information. It gives the idea about the difficulty index of the item and an index of validity. Here the 'item validity' means how well the item measures or discriminates. This is determined by the ability to discriminate between pupils who score high and those who score low on the test as a whole. This information is valuable for many reasons. It provides an opportunity to check up the right items. That is why, it is always desirable to include surplus items in the try out form so that the items that look best in terms of item statistics could be selected for the inclusion in the final form of the test.

Item Validity

Many techniques have been developed to show the degree to which an item is effective in discriminating between high and low ability students on either the total score of the test or some other external criteria. A method most widely used by test constructors is to set up extreme groups in computing the item validity. These extreme groups are generally set up on the basis of criterion score. This may be the total score of the pupils on the test. For the present test the total score on the test has been used to set up two extreme groups. In other words, the T.L. Kelly's method of 27% has been adopted which is based on forming two extreme groups on the basis of total score on the test itself.

The test booklets of 167 students out of 200 were selected. Test booklets which were incomplete from the viewpoint of answers were rejected. They were then arranged in descending order of scores. After arranging them in descending order of scores 27% of booklets from the top and 27% from the bottom that is 50 booklets from both the ends were taken up for the purpose of item analysis. The middle 46% were not taken into account. The next step was to find out the number of pupils answering each item correctly from the upper 27% of the group and the lower 27% of the group. These two groups are denoted as upper group and lower group. The analysis of items

for Stds. V, VI and VII was carried out in this way are summarized and given in table 3.2, 3.3 and 3.4. The discriminative power of the item were read directly from the Flanagan table, a table of the value of the product moment coefficient of correlation in normal five point population corresponding to the given proportion of success.

"The method of determining the discriminative power of test item is widely used in the critical analysis of the test items for standardized test".²

Difficulty Index

The difficulty of a test item is usually expressed in terms of the number or percentage of pupils answering the item correctly. Common practice in the test construction is to attempt to prepare items covering wide range of difficulty. "The test as a whole should have about 50 per cent difficulty for the average pupils".³ Therefore the items should not be so easy as to be passed by every pupil of the group. The items should not be so difficult that none can pass from the group. Because neither of these extreme case makes the item contribute to the discrimination which the test is to make between individuals.

The difficulty value of the items of the present tests were determined by using the data obtained from 27% upper and lower group. For this, the percentage of pupils answering the items from the upper and lower group were added and the sum was divided by two. This could be expressed as under :

$$\text{Difficulty index} = \frac{\% \text{U.G.} + \% \text{L.G.}}{2}$$

In this way the difficulty index of each item was computed. The relevant data are presented in tables 3.2, 3.3 and 3.4 for classes V, VI and VII.

2. Green Jorgensen Herberich, Measurement and evaluation in secondary school 1, (New York : Longmans Green and Co., 1957), p. 93.

3. Ibid., p. 90.

Table 3.2

NO. OF ITEMS OF CLASS V FROM UPPER AND LOWER GROUP
ANSWERING EACH ITEM CORRECTLY, THE DISCRIMINATIVE
VALUE AND DIFFICULTY VALUE

Test No.	Item No.	L.G.		Dis. Index	Diff. value	Remark		
		No. of correct responses	% of correct responses					
1	2	3	4	5	6	7	8	9
1	1	45	50	31	62	.42	76	
	2	4	8	27	54	.41	71	
	3	30	75	12	24	.54	51	
	4	30	70	19	38	.42	58	
	5	33	66	13	26	.41	46	
	6	23	46	13	36	.11	41	R
	7	27	54	06	12	.48	33	
	8	18	36	06	12	.32	24	R
	9	32	64	10	20	.46	42	
	10	23	46	17	34	.13	40	R
	11	10	20	11	22	-.03	21	R
	12	25	50	09	13	.36	34	
	13	22	44	10	20	.27	32	
	14	17	34	06	12	.30	23	R
	15	14	28	06	16	.17	22	R
	16	11	22	05	10	.21	16	R
	17	16	32	08	16	.21	24	
	18	15	30	01	02	.55	16	R
	19	10	20	06	12	.13	16	R
	20	22	44	06	12	.39	28	
	21	09	18	08	16	.03	17	R
	22	27	54	06	12	.48	33	
2	1	50	100	36	72	.61	86	
	2	36	72	09	18	.54	45	
	3	44	88	08	16	.72	52	
	4	47	94	20	40	.62	67	
	5	40	80	27	54	.29	67	
	6	47	94	23	46	.59	70	
	7	43	86	24	48	.43	67	
	8	34	68	07	14	.56	41	

contd.

Table 1.2 contd.

1	2	3	4	5	6	7	8	9
1	42	84	.68	16		.67	50	
10	34	7	1	56		.41	56	
11	27	54	.20	41		.14	47	R
12	42	30	15	26		.60	56	
13	33	66	.07	14		.54	40	
14	31	64	10	20		.46	42	
15	36	72	.08	16		.57	44	
16	38	76	0	04		.75	40	
17	34	75	1.0	38		.42	58	
18	27	54	11	22		.34	38	
19	24	56	.09	18		.41	37	
20	23	46	10	20		.29	33	
21	19	38	.03	06		.53	22	
22	18	36	.08	16		.26	26	
23	11	22	01	02		.48	12	R
24	09	18	07	14		.07	16	R
25	11	22	01	02		.48	12	R
26	17	30	.05	10		.38	24	R
27	19	51	01	02		.61	20	R
28	12	24	0.2	04		.40	14	R
29	10	20	.05	10		.18	15	R
3	1	25	1.0	24	48	.02	49	R
2	20	40	.04	08		.44	24	R
3	25	50	.03	16		.33	33	
4	33	66	04	06		.63	37	
5	44	55	12	24		.64	56	
6	1	64	11	22		.43	43	
7	37	74	02	04		.74	39	
8	41	51	17	34		.49	58	
9	52	72	.09	18		.60	48	
10	08	16	05	10		.12	13	R
11	10	20	05	10		.18	15	R
12	23	40	04	08		.44	24	R
13	06	12	07	14		-.04	13	R
14	07	16	03	06		.26	12	R
15	08	18	04	03		.20	13	R

contd.

Table 3.2 contd.

1	2	3	4	5	6	7	8	9
16	07	14	00	00	00	07	R	
17	05	10	05	10	00	10	R	
18	35	71	22	44	.27	57	R	
19	10	20	02	04	.36	12	R	
20	08	16	01	06	.23	11	R	
21	03	16	01	12	.07	14	R	
4	1	14	36	08	16	.17	22	R
2	17	34	05	10	.34	22	R	
3	29	58	06	12	.51	55		
4	17	34	05	10	.4	22	R	
5	18	30	05	10	.36	23		
6	09	18	03	06	.26	12	R	
7	21	42	03	06	.50	24		
8	31	62	08	16	.49	39		
9	33	66	07	06	.66	36		
10	10	20	10	20	00	20	R	
11	11	32	04	08	.37	20	R	
12	04	01	05	12	-.09	10	R	
13	30	7	05	10	.64	41		
14	17	34	07	14	.27	24		
15	08	16	02	04	.30	10	R	
16	28	56	14	28	.29	42		
5	1	31	62	17	34	.29	48	
2	23	46	07	14	.38	30	R	
3	35	70	13	26	.44	48		
4	36	72	14	28	.44	50		
5	12	24	13	26	-.03	25	R	
6	23	46	07	14	.38	30	R	
7	25	50	06	12	.45	31		
8	12	24	03	06	.33	15	R	
9	13	26	05	10	.26	18	R	
10	33	66	14	28	.39	47		
11	14	28	09	18	.13	23	R	
12	06	12	04	08	.09	10	R	

Table 3.3

IN. OF ITEM OF CLASS VI HAVING UPPER AND LOWER GROUP
ABILITY. EACH ITEM CORRECTLY, THE DISCRIMINATIVE
VALUE, AND DIFFICULTY VALUE.

Test No.	Item No.	L.M.		L.M.		Dis. Index	Diff. Value	Remark
		No. of correct responses	% of correct responses	No. of correct responses	% of correct responses			
		1	4	1	4			
1	1	48	63	43	80	.49	81	R
	2	41	52	31	62	.42	77	
	3	30	100	29	78	.55	89	R
	4	47	58	28	56	.64	77	
	5	47	94	26	52	.55	73	
	6	47	94	25	50	.56	72	
	7	32	64	20	40	.25	52	
	8	40	92	24	45	.53	70	
	9	41	96	32	64	.51	80	
	10	41	84	26	52	.37	68	
	11	41	42	06	12	.38	27	
	12	*	38	34	58	.48	82	R
	13	41	98	50	100	.62	79	
	14	37	74	19	38	.37	56	
	15	33	78	20	41	.37	58	
	16	32	77	11	32	.39	57	
	17	40	80	13	6	.54	53	
	18	35	6	21	42	.27	55	
	19	41	52	04	18	.48	41	
	20	31	61	10	20	.44	41	
	21	45	100	11	56	.41	73	
	1	31	74	20	70	.10	74	R
	2	11	22	11	36	-17	29	R
	3	40	80	15	30	.51	55	
	4	46	92	25	50	.52	71	
	5	43	90	12	24	.67	57	
	6	48	58	18	31	.21	46	
	7	463	96	18	36	.69	66	
	8	42	84	16	32	.53	58	
	9	35	15	10	20	-06	18	R
	10	05	10	10	56	-23	17	R
	11	11	4	10	56	.39	33	R

contd.

Table 3.3 contd.

1	2	3	4	5	6	7	8	9
12	34	77	03	06	.67	37		
13	43	96	.1	42	.66	69		
14	36	71	10	20	.52	46		
15	42	84	04	08	.75	46		
16	33	66	04	08	.63	37		
17	25	70	05	10	.63	40		
18	06	12	08	16	-.07	14	R	
19	21	42	08	16	.31	29		
20	33	66	12	24	.43	45		
21	34	68	06	12	.53	40		
22	13	26	08	16	.14	21	R	
<hr/>								
3	1	50	100	32	64	.66	82	R
2	40	80	22	44	.39	62		
3	42	84	11	22	.61	53		
4	37	74	13	26	.48	50		
5	35	70	11	22	.49	46		
6	44	88	18	36	.55	62		
7	48	96	23	46	.63	71		
8	32	64	13	36	.29	50		
9	30	60	11	22	.40	41		
10	46	92	21	42	.58	67		
11	47	94	20	40	.62	67		
12	22	44	04	08	.47	26		
13	35	70	13	26	.44	48		
14	34	66	18	36	.33	52		
15	11	42	17	34	.09	38	R	
16	20	40	05	10	.40	25		
17	43	86	05	10	.74	48		
18	31	62	10	20	.44	41		
19	45	90	07	14	.74	52		
20	22	44	05	10	.43	27		
21	47	94	17	34	.66	64		

contd.

Ta. 11. 3.3 cont'd.

	1	2	3	4	5	6	7	8	9
4	1	40	00	1	10	.60	50		
	2	00	00	00	12	-.34	07	R	
	3	15	30	00	18	.23	27		
	4	00	10	10	10	-.11	15	R	
	5	10	00	14	00	.00	32	R	
	6	10	00	00	10	.21	27		
	7	41	32	27	54	.32	68		
		11	40	00	10	.28	30		
	8	00	00	00	10	-.05	09	R	
	9	34	00	10	10	.38	49		
	10	34	00	10	10	.06	24	R	
	11	15	20	11	22	.04	11	R	
	12	00	12	05	10	.04	13	R	
	13	07	14	00	12	.04	62		
	14	41	00	21	42	.41			
	15	11	02	13	20	-.06	24	R	
	16	10	00	07	14	.22	22		
	17	11	20	00	10	.16	20	R	
	18	00	00	74	01	.33	58		
					4				
5	1	15	30	14	25	.09	32	R	
	2	24	4	12	24	.20	36		
	3	00	04	01	02	.12	03	R	
	4	42	00	18	3	.56	63		
	5	27	40	10	20	.23	32		
	6	32	00	15	10	.35	47		
	7	14	00	13	16	.02	27	R	
	8	00	00	00	10	.46	32		
	9	10	00	00	12	.26	21		
	10	00	10	00	12	.07	14	R	
	11	11	22	05	10	.21	16	R	
	12	18	30	02	10	.36	23		
	13	14	00	09	1	.13	23	R	
	14	00	00	00	14	.03	15	R	

Table 3.4

IN, ON PAPERS OF CLASS VII FIVE UPPER AND LOWER GROUP STUDENTS EACH ITEM CORRECTLY, THEIR DISCRIMINATIVE VALUE AND DIFFICULTY VALUE

Test No.	Item No.	U.G.		I.G.		Dis. Index	Diff. Value	Remark
		No. of correct responses	% of correct responses	No. of correct responses	% of correct responses			
1	2	3	4	5	6	7	8	9
1	1	47	94	37	74	.36	84	R
	2	43	85	23	46	.45	66	
	3	49	8	40	80	.46	89	R
	4	50	100	32	64	.66	82	R
	5	50	100	37	74	.59	87	R
	6	49	98	28	56	.64	77	R
	7	47	94	30	60	.48	77	R
	8	48	95	17	34	.70	65	
	9	49	98	25	50	.68	74	
	10	47	94	19	38	.64	66	
	11	46	92	20	40	.59	66	
	12	46	96	21	58	.56	77	R
	13	21	42	15	30	.13	36	R
	14	42	64	24	48	.40	66	
	15	25	50	03	06	.56	28	
	16	44	88	11	22	.66	55	
	17	45	90	12	24	.67	57	
	18	47	94	27	54	.53	74	
	19	31	62	06	12	.54	37	
	20	41	82	10	20	.61	51	
2	1	38	76	16	32	.45	54	
	2	44	88	31	62	.34	75	
	3	48	96	26	52	.60	74	
	4	48	96	17	34	.70	65	
	5	49	98	29	58	.63	78	R
	6	40	80	12	24	.56	52	
	7	42	84	11	38	.49	61	
	8	37	74	11	22	.52	48	
	9	19	31	14	28	.11	33	R

contd.

Table 3.4 contd.

1	2	3	4	5	6	7	8	9
13	40	40	13	13	13	.61	78	R
11	4.	4	15	30	.	.5	57	
12	3	3	1	2	.	.30	57	
13	3	3	16	36	.	.17	46	
14	37	24	11	11	.	.55	46	
15	2	23	12	12	.	.50	53	
16	37	14	11	12	.	.52	43	
17	43	30	17	24	.	.62	55	
18	11	34	15	10	.	.34	22	
19	10	20	05	16	.	.06	18	R
20	17	14	02	04	.	.21	09	R
21	4.	84	25	50	.	.39	67	
22	26	60	07	14	.	.12	32	
23	12	36	07	12	.	.32	24	
24	1	20	01	12	.	.24	20	R
25	3	4	13	26	.	.43	50	
26	46	50	01	01	.	.62	28	
27	13	5	16	10	.	.26	16	R
<hr/>								
2	1	34	14	22	44	.21	54	R
2	23	77	16	36	.	.53	61	
3	41	46	26	52	.	.50	74	
4	0	56	18	51	.	.21	50	
5	7.	10	31	60	.	.62	79	
6	4	40	1	12	.	.22	36	
7	41	1	1	48	.	.39	64	
8	10	36	13	14	.	.24	25	
9	1	44	14	11	.	.17	36	R
10	5.	11	15	12	.	.11	15	R
11	21	47	17	14	.	.34	28	
12	11	12	09	18	.	.06	20	R
13	2	56	0	16	.	.44	36	
14	24	21	07	14	.	.20	21	
15	36	72	14	28	.	.44	50	
16	20	50	04	08	.	.58	33	
17	2	52	10	20	.	.35	36	
18	40	50	16	32	.	.61	61	

contd.

Table 3.4 contd.

1	2	3	4	5	6	7	8	9
19	34	65	05	10	.51	39		
25	57	74	10	20	.54	47		
4	1	50	10	20	.55	89	R	
2	45	10	14	20	.64	59		
2	43	50	20	60	.52	79	R	
	31	60	18	36	.27	49		
5	35	7	10	20	.51	45		
6	30	60	14	28	.33	44		
7	43	80	15	26	.60	56		
1	14	28	11	22	.08	25	R	
9	35	70	05	10	.63	40		
10	32	64	03	06	.65	35		
11	30	60	02	04	.67	32		
12	37	74	04	08	.68	41		
13	24	48	02	04	.60	26		
14	17	54	04	08	.55	31		
15	24	40	06	12	.43	30		
16	31	60	13	26	.41	46		
17	3	70	13	26	.44	43		
18	36	72	00	06	.0	-	R	
19	11	22	04	08	.25	15	R	
20	34	68	06	16	.53	42		
5	1	26	52	07	14	.43	33	
2	24	40	10	32	.17	40	R	
3	1	26	15	30	-.05	28	R	
4	25	50	10	20	.38	36		
5	26	52	11	22	.33	37		
6	07	1	17	34	-.27	24	R	
7	19	38	12	24	.16	31	R	
8	07	14	06	12	.04	13	R	
9	38	76	13	26	.50	51		
10	33	66	09	18	.49	42		
11	16	32	09	18	.18	25	R	
12	13	26	13	26	.0	-	R	

contd.

Table 3.4 contd.

	1	2	3	4	5	6	7	8	9
1	.6	.	.11	.11	.10	.51	.37		
2	.2	.1	.1	.1	.11	.34	.33		
3	.1	.10	.11	.10	.10	.63	.26	R	
4	.2	.16	.14	.13	.13	.56	.32		
5	.11	.12	.11	.22	.11	.42	.42		
6	.26	.22	.10	.10	.10	.35	.36		
7	.11	.11	.11	.22	.11	.45	.44		
8	.31	.7	.11	.16	.16	.57	.44		
9	.3	.41	.19	.18	.18	.32	.32		
10	.44	.11	.14	.24	.24	.34	.56		
11	.1	.36	.17	.14	.14	.29	.25	R	
12	.19	.21	.03	.06	.06	.47	.22	R	
13	.11	.11	.05	.10	.10	.09	.19	R	
14	.26	.52	.03	.16	.16	.40	.34		

Outline the Format of the Test

Looking to the nature of the test, the omnibus method for the arrangement of sub-test was not suitable. Hence the descramble pattern was adopted for the arrangement of sub-test, because sub-test is based on paragraph or story for reading comprehension. Therefor, the students after reading have to answer the question given for each sub-test.

Items in the sub-test were arranged according to the difficulty level. In each sub-test the following order of the type of questions was followed :

- 1 Multiple choice
- 2 Sequence of events or ideas.

Again the sub-tests were arranged according to the average difficulty level of the test. That is easier sub-test was placed first and difficult one was placed at the end. In order to arrange the test according to the average difficulty

value, the average difficulty of the sub-test was found out by dividing the sum of the difficulty indices of the selected items by the number of items selected for the sub-test. The tables 3.6, 3.7 and 3.8 show the average difficulty and the new order of the sub-test.

The average difficulties of the tests for classes V, VI and VII were found to be 45.10, 50.7, and 47.06 respectively, which indicate that the tests are not very hard or very easy.

Table 3.5

NO. OF ITEMS SELECTED FROM EACH SUB-TEST, THEIR AVERAGE DIFFICULTY VALUE AND NEW ORDER OF THE TEST FOR READING COMPREHENSION FOR PUPILS OF CLASS V

Test	No. of items selected	Average difficulty value	New order of the tests
1	12	44.00	III
	1	50.75	I
2	7	44.86	II
4	8	33.00	IV } A
5	5	44.80	IV } B
	52	45.10	Average difficulty

Table 3.6

NO. OF ITEMS SELECTED FROM EACH SUB-TEST, THEIR AVERAGE DIFFICULTY VALUE AND NEW ORDER OF THE TEST FOR READING COMPREHENSION FOR PUPILS OF CLASS VI

Test	No. of items selected	Average difficulty value	New order of the tests
1	18	61.61	I
2	15	49.47	III
3	19	50.11	II
4	9	43.67	IV } A
5	7	36.86	IV } B
	68	57.79	Average difficulty

Total 17

NO. OF ITEMS SELECTED FROM EACH SUB-TEST, THEIR
AVERAGE DIFFICULTY VALUE, AND NEW ORDER OF THE
TEST FOR HAVING A COMBINATION FOR STUDENTS OF
CLASS VII

Test No.	No. of items selected	Average difficulty value	New order of the tests
1	12	5.47	I
2	7	4.70	II
3	16	4.62	III
4	15	41.60	IV A
5	5	33.50	V $\begin{cases} A \\ B \end{cases}$
6	10	39.00	V B & C
		47.06	Average difficulty

Opinion

From the try-out of the test it was found that instructions given to the examinees were quite all right and there was no need of revision, or any change in the instruction. All students were interviewed by the research fellow with a view to know their opinion about the test. From the talk with the student, it was found that students liked the test more for its novelty. Most of them were reading and answering the items very attentively. Most of the students of Std. V took about 10 minutes to do the test, the students of Std. VI took about 15 to 17 minutes while the students of Class VII took about 20 minutes to complete the test. The students were asking about the result. The mark-masters were also asking about the result of the test. The results were communicated to the school.

CHAPTER IV

ESTABLISHMENT OF NORMS

It was decided to set the tests printed by letter press because the letter press printing gives the most attractive and flexible finish. After deciding the size of the test booklet and type, the writer was given in the press with necessary instructions. Five hundred test booklets for each class were printed. After this the next question was to decide the time to be allowed to pupils to answer the questions. This is described in the paragraph to follow.

Time Allowance

Before giving a test to a large sample for establishing the norms, it is very essential to fix the appropriate time limit for answering the test. This is generally done by considering the record of the time taken by different individuals at the time of preliminary testing. From this, one can get the approximate time. In order to decide the exact time to be allowed to answer the question, some definite criteria shall be fixed. There are different views about the time to be allowed to answer the test. This becomes clear from the following.

"Lindquist suggests that in general achievement tests the time allowance should be so adjusted that 75 per cent of the pupils will have time at least to consider all items in each section. Ruth seemed to favour time limits so that 90% can attempt all items within their power".¹

From this it was decided that the time allowance be fixed in such a way that 75% of pupils will have time at least to consider all items. After deciding this criterion for fixing the time limit the test were administered to 40 pupils of each class of V, VI and VII. The group of pupils that were selected, were heterogeneous in nature. The research fellow with the help of the class teacher

1. C.C. Ross. Measurement in Today's Schools (Englewood Cliffs, N.J. : Prentice Hall, Inc., 1963), p. 156.

at initiated the test. The pupils were given the following instructions.

1. Don't open the test booklet until you are told to do so.
2. I will read aloud the instructions given on the front page of the test booklet. When I read aloud the instructions you have to read them silently with me.
3. When I say "start" begin reading the story or paragraph that you have to read. When I say stop you have to stop reading and answer the questions given below it. This I will say only for the first test then after you have to take the test one by one and read them and answer the questions given below each. When you finish the whole test you have to raise your hand.

After giving these instructions it was ascertained whether the pupils have followed them properly. The pupils were then asked to open the test no. 1. They were asked to start. The stop watch was started. After one minute the research fellow asked to stop and drew a line to show where they have reached and then answer the questions below it. Further the pupils were asked to continue the reading and answering the test till they finish. The number of pupils raising their hands between particular time limits were noted down. This process was carried out for all the three classes. It was found that in case Class V the 30th pupil could finish the test after 53 minutes. In case of Class VI the 30th pupil could finish the test after 44 minutes, and 30th pupils of class VII could finish the test at 45 minutes. From this, the time limits that were fixed for children V, VI and VII were as under:

1. 55 minutes be allowed for answering the test to pupils of Class V.
2. 50 minutes be allowed for answering the test to pupils of Class VI.
3. 46 minutes be allowed for answering the test to pupils of Class VII.

Sampling

Sampling is a process by which relatively small number of individuals or measures of individuals are selected for analysis, and findin out some thing for the entire population from which the sample is drawn. Therefore the sample must be representative. For the present tests it was decided to establish norms only for rural area. Hence the sample was drawn from the rural area only by simple random method. The sample includes boys and girls from mix schools only. The following table gives the idea of the number of boys and girls included in the sample.

Table 4.1
NO. OF BOYS AND GIRLS DRAWN AS SAMPLE FROM CLASSES V, VI AND VII

Class	No. of Boys	No. of Girls	Total
V	275 (65)	161 (37)	436
VI	265 (60)	143 (35)	408
VII	260 (7)	138 (33)	418

Figures in brackets indicate percentages

Administration and Scoring of the Test

The administration of the tests were carried out after decidin; the schools. The tests were administered by the research fellow herself. After administration of the tests, the next huge task was to score them. The scoring was done manually according to the predetermined scoring key. While scoring, the following points were kept in mind.

- i. If the student has marked two or more answers to any item, the answer be not considered though one of them is correct and no credit be given to such answers.
- ii. The student who has changed his answer according to the instruction given and if it is correct, credit be given to it.

The test books were then scored and the data obtained were utilized for the purpose of establishing norms.

Establishment of Norms

The raw score of the pupil on the test is the total number of items that have been answered correctly because one point is given to one correct response in case of objective items. The raw score as it is cannot be interpreted, though it is a fundamental piece of information. The raw score does not give any idea about the individual. Besides, the psychological and educational tests have no predetermined standard of marking or scaling. In educational test, the individual's score is evaluated only by comparing it with scores obtained by others of his age or grade on the same test. Therefore in the test construction, the establishment of norms is one of the important steps. The term 'norms' can be defined as the average performance of the average group of individuals. As its name implies a norm is the normal or the average performance.²

There are various types of norms, namely age norms, grade norms, percentile norms, standard score and quotient norms. In reading test generally grade norms, percentile norms and standard score norms are established. For the present tests the grade norms with percentile and standard scores have been computed. The median scores found out for different grade levels are called the grade norms. Grade norms with percentile and standard scores help the user to interpret class scores as well as individual scores. Therefore here the median is considered to be the grade norms of pupils of classes V, VI and VII. For calculating mean, median, mode and percentile norms, the frequency distributions were drawn. The respective data are presented in table 4.2

2. Anne Anastasi, *Psychological Testing*, (New York : The Macmillan Co., 1966), p. 24.

Table 4.2
FREQUENCY DISTRIBUTIONS OF SCORES MADE BY BOYS AND
GIRLS OF CLASSES V, VI AND VII ON READING
COMPREHENSION TESTS

Marks	Class V			Class VI			Class VII		
	Boys N	Girls N	Total N	Boys N	Girls N	Total N	Boys N	Girls N	Total N
5-6							2	2	4
6-7							2	4	6
7-8				4	-	4	12	5	17
8-9				0	-	-	10	3	13
9-10				2	1	3	18	4	22
10-11				4	2	6	19	8	27
11-12				4	2	6	7	7	14
12-13				12	4	16	16	12	28
13-14	1		1	6	4	10	25	6	31
14-15	11	10	21	14	5	22	12	7	19
15-16	9	9	18	15	11	26	26	8	34
16-17	7	25	27	11	38	29	9	36	
17-18	47	73	70	39	18	57	40	14	54
18-19	4	53	51	13	44	34	8	42	
19-20	44	35	24	32	16	48	6	14	20
20-21	45	19	64	32	21	53	13	16	29
21-22	16	20	42	30	20	50	5	5	10
22-23	22								
23-24	18	14	32	5	5	11	4	3	7
24-25	8	11	19	6	6	14		3	3
25-26	5	2	7	-	-	-	-	-	-
	275	161	436	265	143	403	280	138	418
Mean	23.95	23.17	23.66	27.95	26.34	27.38	37.22	34.83	36.57
S.D.	6.69	7.52	7.02	9.72	9.27	9.60	11.55	13.67	12.55
SDn	23.92	22.74	23.43	21.97	25.08	26.27	34.54	32.50	34.03
U ₁	24.60	23.64	28.61	32.92	32.48	32.79	45.5	45.13	45.34
U ₂	19.55	17.49	13.92	20.68	19.04	20.03	28.1	23.11	27.04
S	4.53	5.58	4.85	6.12	6.72	6.38	8.7	11.00	9.15

The study of table 4.2 shows that there is a mean difference between the means of boys and girls. Though the difference is small it was subjected to further statistical treatment. The mean difference was tested for significance by using t-test technique. The relevant data are presented in table 4.3.

Table 4.3

MEAN DIFFERENCES AMONG BOYS AND GIRLS, THEIR MEAN, SD, MEAN DIFF.
AND CR OF CLASSES V, VI AND VII

Std.	Sex	No.	Mean	SD	Mean diff.	CR	Remark
V	Boys	275	23.45	6.69	0.78	1.08	NS
	Girls	141	23.1	7.52			
VI	Boys	265	27.95	6.72	1.61	1.65	NS
	Girls	143	24.34	9.27			
VII	Boys	280	37.12	11.55	2.39	1.77	NS
	Girls	138	34.63	13.67			

NS = Not significant

The study of table 4.3 reveals that the mean difference between the means of boys and girls of classes V, VI and VII are not significant at any level. This led to conclude that the boys and girls are by and large equal with regard to reading comprehension in Gujarati. Hence it was thought not to fix separate norms for boys and girls. The percentile norms and standard score norms are given in tables 4.4 and 4.5.

Table 4.4
PERCENTILE NO. 10 FOR PUPILS OF CLASSES
V, VI AND VII

Raw Score	Class V	Class VI	Class VII
1	2.27	-	-
2	3.80	-	-
3	1.34	-	-
4	2.13	.57	.12
5	3.7	1.72	.35
6	5.34	2.86	.60
7	7.19	3.88	1.00
8	9.63	4.78	1.56
9	12.08	5.68	2.11
10	14.41	6.17	2.79

contd.

Table 1.4 contd.

Raw Score	Class V	Class VI	Class VII
17	18.11	12.25	3.59
18	21.11	14.34	4.39
19	25.2	20.55	5.94
20	31.11	24.31	3.25
21	35.11	29.21	10.57
22	40.83	33.33	12.52
23	44.25	37.25	14.11
24	55.67	41.18	15.71
25	58.91	44.93	18.18
26	62.96	48.53	21.53
27	67.01	52.12	24.33
28	71.71	56.25	28.71
29	77.06	60.91	33.01
30	82.42	65.56	37.32
31	86.05	69.44	40.99
32	87.96	72.52	44.02
33	89.37	75.65	47.05
34	91.51	78.27	49.92
35	92.80	80.30	52.63
36	94.27	82.50	55.34
37	95.76	84.42	57.46
38	97.36	86.27	58.97
39	98.07	86.07	60.49
40	99.30	89.38	62.48
41	99.31	91.20	64.95
42	99.96	91.01	67.42
43	-	92.08	67.78
44	-	93.38	72.00
45	-	94.69	74.24
46	-	95.59	75.92
47	-	96.08	77.03
48	-	96.57	78.15
49	-	97.06	79.78
50	-	97.54	81.94
51	-	98.04	84.09
52	-	98.41	86.04
53	-	98.65	87.80

contd.

117-107-74/4 cont'd.

Expt	GT 150	GT 150	GT 150
	%	%	%
1	-	98.50	82.55
2	-	98.50	91.85
3	-	98.50	91.80
4	-	98.50	93.02
5	-	98.50	94.22
6	-	98.50	95.57
7	-	98.50	96.93
8	-	-	97.85
9	-	-	98.33
10	-	-	98.60
11	-	-	98.20
12	-	-	98.52
13	-	-	97.84

Norms for Reading Speed

It was decided to give norms for reading speed also. Therefore, the frequency distribution of the words read per minute was prepared for pupils of classes V, VI and VII. Before establishing the norms, it was thought to see whether there are sex differences with regard to reading speed. For this, the means for boys and girls were computed and tested for significance. All these data are presented in table 4.5 and table 4.6.

Table 4.5
FREQUENCY DISTRIBUTIONS OF WORDS READ PER MINUTE BY
BOYS AND GIRLS OF CLASSES V, VI AND VII

Age	Class V			Class VI			Class VII		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
310-320	-	-	-	-	-	-	1	-	1
290-309	-	-	-	-	-	-	-1	-	1
270-279	-	-	-	10	1	11	2	-	2
250-259	-	-	-	2	2	4	2	-	2
230-249	-	-	-	7	3	10	19	4	23
210-219	-	1	1	8	4	12	9	3	12
190-209	-	3	3	9	12	21	42	12	54
170-179	1	2	3	22	19	41	30	20	56
150-169	3	8	31	29	28	57	38	31	69
130-149	4	10	30	57	24	81	40	25	65
110-129	68	37	105	49	17	66	54	30	84
90-109	40	31	61	42	15	57	19	10	29
70-79	62	40	102	26	17	43	13	1	14
50-64	37	18	55	4	1	5	4	2	6
30-49	4	11	15	-	-	-	-	-	-
N	2.5	161	436	265	143	408	280	138	418
Mean	102.92	99.62	101.70	141.16	146.49	143.03	158.29	150.8	155.82
S.D.	31.7	35.35	33.19	48.78	44.27	47.31	46.81	36.91	43.80
SDn.	101.13	96.92	90.50	133.54	147.42	137.65	154.76	150.15	152.69
⁰ 3	133.69	120.2	122.4	163.81	175.03	168.45	192.36	174.00	186.11
¹ 1	77.60	75.13	77.72	106.76	112.74	158.45	122.09	123.83	122.71
² 4	23.02	22.80	22.96	18.53	31.13	30.00	35.14	25.09	31.70

Table 4.6

No. OF KIDS IN CLASS, THEIR MEANS, S.DS. MEAN DIFFERENCES AND CRs.

Class	Sex	N.	Mean	S.D.	Mean Diff.	CR	Remarks
V	Boys	275	102.42	31.73	3.30	.98	NS
	Girls	161	101.62	35.35			
VI	Boys	265	141.16	43.78	5.33	1.13	NS
	Girls	163	140.41	44.27			
VII	Boys	280	158.20	46.81	7.49	1.78	NS
	Girls	138	150.80	38.91			

The study of table 4.6 reveals that mean differences between the scores of boys and girls of classes V, VI and VII are not significant at any level. Therefore there are no sex differences with regard to reading speed. This also suggests that there is no need of giving separate norms for boys and girls for reading speed.

Norms for Reading Speed

For establishing the norms for reading speed, it was presumed that the rate of reading is by and large normally distributed in the population. Assuming normality of the distribution, the curve was divided into five parts. The base line consisting of $M \pm 3\sigma$ is divided into 5 equal parts, that is, $M \pm 1.5\sigma$. Therefore it was decided to give C grade to those who score between $M \pm .6\sigma$ called average reader. B grade to those who score between $M + .6\sigma$ and $M + 1.2\sigma$ called above average reader and A grade to those who score $M + 1.8\sigma$ and above called fast reader. Similarly D grade be given to those who score between $M - .6\sigma$ and $M - 1.2\sigma$, called below average reader and E grade be given to those who score below $M - 1.8\sigma$ called poor reader.

Therefore by using the M and σ of each class, the latter norms for pupils of classes V, VI and VII were computed and given in part a in table 4.7.

Table 4.7
LETTER GRADE NORMS FOR READING SPEED OF
PUPILS OF CLASSES V, VI AND VII

Stds. Grade	V Scores	VI Scores	VII Scores	Remarks
A	162 and above	229 and above	235 and above	Fast reader
B	125 to 161	172 to 223	183 to 234	Above average reader
C	82 to 120	115 to 171	129 to 182	Average reader
D	42 to 81	58 to 114	77 to 128	Below average reader
F	41 and below	57 and below	76 and below	Poor reader

RELIABILITY AND VALIDITY

No matter how carefully the test has been planned and prepared, its merit should be established. It is, therefore, necessary or, rather speak up to, study the reliability and validity of the test. There is no need of discussing the meaning and concept of the terms reliability and validity. As it is often said by test constructors that reliability is the consistency with which a test gives the same results in measuring whatever it does measure. The reliable test gives nearly the same result on two different occasions. But there should be no learning or training between the intervening period of the two administration of the test. There are different methods in vogue to study the reliability of a test.

Methods of Estimating Reliability

The reliability is purely a statistical concept. For establishing the reliability of the present test following methods have been used.

1. Split-half method
2. K-R. formula
3. Analysis of Variance Approach

Split-Half Method

This is the most widely used method of estimating the reliability of the test because parallel form method as well as alternate forms have certain limitations. To overcome the limitations of these methods, the split-half method is generally used by the test constructor. The method consists of dividing the test into two equal halves in such a way that one of the halves contains odd numbered items that is item number 1, 3, 5, 7, 9 etc., and the second half consists items number 2, 4, 6, 8, 10 .. etc. Both the halves are administered at one and the same time so that difficulty such as light, heat, sound, emotional state of the individual and setting arrangement during the administration of the test could be well controlled. The effect of the rate memory could also

been eliminated. Therefore this method has been used for studying the reliability of the tests. For this about 100 test booklets from each class were taken at random and the scores made by pupils on odd numbered items and even numbered items were found out. The correlation between the scores on odd and even numbered items were then computed by using product moment method. Tables 5.1, 5.2 and 5.3 show the scatter diagram and the half test reliability of the test.

Table 5.1
SCATTER DIAGRAM OF ODD AND EVEN NUMBERED ITEM SETS OF STD. V

Scores on odd numbered item set

Score	1-5	6-	11-	16-	21-	Total
	10	15	20	25		
21-25				1		1
16-20			9	12	7	28
11-15		5	17	8		30
6-10	2	14	20	1		37
1-5	1	1	2			4
Total	3	20	43	22	7	100

$$\text{Half test reliability} = 0.604$$

From the half test reliability the reliability of the whole test was computed by using Spearman Brown's formula.

$$r_{tt} = \frac{2 r_s}{1 + r_s} = \frac{2 \times .604}{1.602} = \frac{1.208}{1.602} = 0.75$$

Table 5.2

SCATTER PATTERN OF ODD AND EVEN NUMBERED ITEM SETS OF STD. VI

Scars on odd numbered item set

	Score	1-	11-	16-	21-	26-	31-	Total
		10	15	20	25	30	35	
Scars on even numbered item set	31-35							
	26-30					1		1
	21-25				4	3		7
	16-20		2	3	4			9
	11-15	5	15	16	3		1	40
	6-10	13	19	6				38
	1-5	4	1					5
	Total	22	37	25	11	4	1	100

$$r_{tt} = 0.70$$

The reliability of the whole test is calculated by using the formula:

$$r_{tt} = \frac{2 r_s}{1 + r_s} = \frac{2 \times 0.7}{1.7} = \frac{1.4}{1.7} = 0.823$$

Table 5.3

SCATTER PATTERN OF ODD AND EVEN NUMBERED ITEM SETS OF STD. VII

Scars on odd numbered item set

	Score	1-	11-	16-	21-	26-	31-	36-	Total
		5	10	15	20	25	30	35	40
Scars on even numbered item set	36-40								
	31-35						1		1
	26-30				1	2	3		6
	21-25			1	4	7	5	1	18
	16-20	1	14	10	4			1	30
	11-15	3	1	13	8	1	1		27
	6-10	1	7	7	2				17
	1-5		1						1
	Total	4	10	35	25	14	10	1	100

$$\text{Half test reliability} = 0.667$$

From the half test reliability the reliability of the whole test is calculated by using the formula:

$$r_{tt} = \frac{2 r_s}{1 + r_s} = \frac{2 \times .667}{1.667} = \frac{1.334}{1.667} = 0.80$$

The Method of Kuder Richardson Equivalence

This method was developed by Kuder Richardson. Therefore, it is also known as Kuder Richardson method. The method attempts to estimate the reliability of a test, free from the objection raised against split-half method and test-retest method. The estimation of the reliability depends upon item statistics. Four formulas for determining test reliability have been developed. However the most accurate and practical formula used by the investigators is given below:¹

$$r_{tt} = \left(\frac{n}{n-1} \right) \left(\frac{\sigma_t^2 - pq}{\sigma_t^2} \right)$$

Where n = number of items in the test

p = proportion of passing an item

q = 1-p Proportion of failing an item

σ_t^2 = the SD of the test score t

r_{tt} = reliability of the whole test

The reliability of the present tests have been studied by using this method too.

For this 100 answer books were taken at random from each class that is from classes V, VI and VII. The number of pupils passing, each item correctly were found out. From this data the number of pupils answering each item incorrectly were found out to determine the reliability by the formula described. In order to reduce the size of the report the detail tables showing the number of pupils answering each item correctly and incorrectly their proportion are not given. The pq, σ_t^2 , and n for each class have been reported in table 5.4.

1. J.P. Guilford, *Fundamental of Statistics in Psychology and Education*, (New York : McGraw Hill Book Co. Inc., 1956), p. 454.

Table 5.4
THE Q_t, T_t, σ_t AND σ²_t FOR CLASSES
V, VI AND VII

Class	no. of items in the test n	$\sum pq$	σ_t
V	56	11.1124	7.56
VI	58	13.8721	9.82
VII	70	16.4226	11.45

The reliability by K.F. formula 20 for the class V

$$\begin{aligned}
 r &= \frac{n}{n-1} \left(\frac{\bar{T}_t^2 - \sum pq}{\sigma_t^2} \right) \\
 &= \frac{56}{55} \left(\frac{50.7116 - 11.1124}{58.7116} \right) \\
 &= .83
 \end{aligned}$$

The reliability for the class VI

$$\begin{aligned}
 r &= \frac{n}{n-1} \left(\frac{\bar{T}_t^2 - \sum pq}{\sigma_t^2} \right) \\
 &= \frac{58}{57} \left(\frac{96.3611 - 13.8721}{95.3611} \right) \\
 &= .87
 \end{aligned}$$

The reliability for the class VII

$$\begin{aligned}
 r &= \frac{n}{n-1} \left(\frac{\bar{T}_t^2 - \sum pq}{\sigma_t^2} \right) \\
 &= \frac{70}{69} \left(\frac{140.3731 - 16.4226}{139.3731} \right) \\
 &= .89
 \end{aligned}$$

After calculating the reliability by K-R formula-20 the same data were used for calculating the reliability of the test by analysis of variance approach. The summary of the analysis of variance is presented in tables 5.5, 5.6 and 5.7.

Table 5.5

SUMMARY OF ANALYSIS OF VARIANCE OF TEST
FOR CLASS V

Source of variance	Sum of squares	d.f.	Mean variance
Examinees			
($\sum d^2_e$)	112.907	90	1.14047
Item			
($\sum d^2_i$)	145.667	51	3.66013
Remainder			
$\sum x^2_r$	1000.3329	5149	.198125
Total	1299.9069	5199	
($\sum x^2_t$)			

$$\frac{\text{Examiner's variance} - \text{Reminder's variance}}{\text{Examiner's variance}} = \frac{\sum d^2_e - \sum x^2_r}{\sum d^2_e}$$

$$= \frac{1.14047 - .198125}{1.14047} = \frac{.942345}{1.14047} = .826277$$

$$= .8263$$

$$= .826$$

$$= .83$$

Table 5.6

SUMMARY OF ANALYSIS OF VARIANCE OF TEST FOR
CLASS VI

Source of variance	Sum of squares	d.f.	Variance
Examinees	130.4910	90	1.3180
($\sum d^2_e$)			
Item			
($\sum d^2_i$)	252.9725	67	3.4772
Remainder			
$\sum x^2_r$	1267.9353	6633	.1912
Total ($\sum x^2_t$)	1631.3986	6799	

$$rtt = \frac{(\text{Examinees variance} - \text{Reminder variance})}{(\text{Examinees variance})} = \frac{\sum d^2_e - \sum x^2_r}{\sum d^2_e}$$

$$= \frac{1.3180 - .1912}{1.3180} = \frac{1.1268}{1.3180} = .8549$$

$$= .855$$

$$= .86$$

Table 5.7
SUMMARY OF ANALYSIS OF VARIANCE OF TEST
CLASS VII

Source of Variance	Sum of squares	d.f.	Mean variance
<u>Examination</u>			
$(\sum d^2_e)$	77.178	99	1.8178
Item			
$(\sum d^2_i)$	25.354	77	3.3580
<u>Remainder</u>			
$(\sum x^2_r)$	140.7144	702.1	.1920
Total			
$(\sum x^2_t)$	140.7144	779.9	

$$\frac{(\text{Examination})}{\text{M.Variance}} = \frac{(\text{Remainder's})}{\text{M.Variance}} = \frac{\sum d^2_e - \sum x^2_r}{\sum d^2_e}$$

$$= \frac{1.8178 - .1920}{1.8178} = \frac{1.6258}{1.8178} = .8943778 \\ = .89$$

Table 5.8

RELIABILITY COEFFICIENTS OF TESTS FOR
CLASSES I, VI AND VII AS DETERMINED
BY MR. HORN'S METHODS

Methods	Class		
	V	VI	VII
Split-Half	0.75	0.823	0.80
t.s. Formula-20	0.83	0.87	0.89
Analytic Variance Approach	0.83	0.86	0.89

The study of table 5.8 shows that all the three tests have substantially high reliability. Hence it could be said that the tests are reliable.

Validity

The validity of the test depends upon the efficiency with which it measures what it attempts to measure. It is also defined as the accuracy with which the test measures what it claims to measure. The validity and purpose of the test are closely related. E.g., to say that the test for measuring

reading comprehension should measure reading comprehension and not any other thing, such as intelligence, or expression. Therefore in the case of valid reading comprehension test, the students who are good at reading comprehension should score more marks than those who are weak. This suggests that for validating the test, it must be compared with some accepted standard, or other criteria which are considered by experts as the best evidence of the trait, or ability to be measured by the test. Therefore the selection of validation criteria is of paramount importance in the process of test validation.

Methods for Determining Validity

Basically, all procedures used for determining the test validity are concerned with the relationship between performance on the test and other independently observable facts about the behaviour characteristics under consideration. The techniques that are used for determining these relationships are numerous and have been described by various names. The test constructor often speak about the content, construct or concept validity, concurrent, convergent and predictive validity. Here an attempt is made to study the construct validity, concurrent validity and factorial validity.

Construct or Concept Validity

For determining the construct validity the first task is to define the measure used in the present tests. That is the term reading comprehension should be defined. What does this phrase or the concept really mean. For establishing the construct validity of the present tests the term reading comprehension has been translated into components, as were found from the study of the existing tests on reading comprehension during a review of the past work done in this area. Accordingly, the term 'Reading comprehension' is analysed into behavioural components such as (i) ability to give significant details of what is read, (ii) ability to follow the sequence of events, (iii) ability to give caption and draw generalization, (iv) ability to give the meaning of words or phrase and (v) ability to find out the relationship of ideas. It is against this analysis that the test items should be checked to see if they

level of content validity. This type of analysis differs from test validity, i.e. at the content validity.

For establishing this type of validity the investigators took help of the experts in Gujrati that is the method masters in Gujrati who also knew the evaluation process for analysing the items of the test. The number of items from each test, relating each component are presented in table 5.9.

Table 5.9
COMPARISON AND TOTAL NUMBER OF ITEMS FOR EACH TEST OF CLASSES V, VI AND VII

Components	Classes		
	V	VI	VII
	Total No. of items	Total No. of items	Total No. of items
1 Give significant details	21	20	25
2 Give sequence of events	3	17	21
3 Give caption & draw generalization	2	2	1
4 Give meaning of diagram	16	20	25
5 Find out the relationship of idea	10	9	6
Total	59	68	78

The data of table 5.9 reveals that the tests measure all components of reading comprehension. Therefore it could be said that the test has content and construct validity.

Concurrent Validity

Evidence of validity may be obtained from the relationship with other currently obtainable information about an individual. "The relation between test scores and indices of criterion status obtained at approximately the same time is known concurrent validity".² Here the criterion status has been

2. Arne Arnestad, op. cit., p. 141.

obtained by asking the teachers who are in close contact with pupils, to give their estimate about the pupils-ability to comprehend. Therefore rating have been employed in the validation of the test. The estimates of rating will serve as the criterion. The correlation between teacher's estimates and score obtained by the pupil on the test is then computed. The obt in a correlation is known as the coefficient of validity.

Therefore, the concurrent validity of the present tests have been established by asking the teachers to rate their pupil on five point scale with regard to reading comprehension. In order to help the teacher in rating, the five points A, B, C, D, E were made clear to them. The teachers were requested to keep in mind the following specifications for judging the grades to be given to pupils.

Grades and their Specifications

Grade A - be given to those who are very good at reading and understand easily what they read and answer almost all questions correctly asked on the matter they have read.

Grade B - be given to those who are good at reading and understand with little help the matter they read. They answer most of the questions correctly asked on the matter they read.

Grade C - be given to those who are moderate at reading comprehension and understand with sufficient help what they read. Normally, they answer questions correctly on what they read.

Grade D - be given to those who are poor at reading comprehension and understand little of what they read. They do answer questions but rarely they are correct.

Grade E - be given to those who are very poor at reading comprehension and understand too little of what they read. They seldom answer questions asked on what they read.

The teachers were asked to put A, B, C, D and E as the class result on the top of the test booklet of the pupil, after they had taken the test. Thus the rating of 50 pupils of class V, 66 pupils of class VI and 52 pupils of class VII were obtained from two schools. The coefficient of correlation between the rating of the teachers and the scores on the test were computed by rank product moment method. The relevant data are presented in tables 5.10, 5.11 and 5.12.

Table 5.10
SCATTER PATTERN OF SCORES MADE BY PUPILS OF CLASS V
ON READING COMPREHENSION AND TEACHER'S OPINION

Opinions of the teachers

Opinion Scores	E	D	C	B	A	Total
41-45					1	1
36-40		1	2	2		5
31-35			3	4		7
26-30		2	5	2		9
21-25	1	3	7	1		12
16-20	2	2	6	2		12
11-15		2	2			4
Total	3	10	25	11	1	50

$$r = + 0.43$$

Table 5.11
SCATTER PATTERN OF SCORING MADE BY PUPILS OF CLASS VI
ON READING COMPREHENSION AND TEACHER'S OPINION

Opinions of the teachers

Opinion Scores	E	D	C	B	A	Total
51-55					2	2
46-50			3	4		7
41-45		2	5	3		10
36-40	3	7	5			15
31-35	1	3	4			8
26-30	3	4	1	1		9
21-25	1	3	2			6
16-20	1	2				3
Total	6	17	22	13	2	60

$$r = + 0.57$$

Table 5.12

SCATTER DIAGRAM OF SCORES MADE BY PUPILS OF CLASS V.I
IN READING COMPREHENSION TEST AND TEACHER'S OPINION

Opinion of the teachers	Opinion scores						Total
	E	D	C	B	A		
51-65				2	1	3	
56-60				1	1	2	
51-55		1	2	3		6	
46-50			5	4	1	10	
41-45		2	3	6		11	
36-40	1	3	7	2		13	
31-35	1	2	1			4	
26-30		2				2	
21-25	1					1	
Total	5	10	18	18	3	52	

$$r = + 0.68$$

The study of table 5.1, 5.11 and 5.12 reveals that the concurrent validity for test of the class V is 0.43, for the class VI is + 0.57 and for the class VII is 0.68. These validity coefficients could be considered as sufficiently high. Thus the tests have good concurrent validities.

Factorial Validity

A primary concern of the measurement is to find tests that measure some common function and thus define what is called factor. Factor analysis is the statistical procedure for isolating the common functions called factors. "A major purpose of factor analysis is to simplify the description of behaviour or reducing the number of categories from an initial multiplicity of test variables to a few common factors or traits."³ In order to isolate and study the factorial composition of the test 100 test booklets from each class of V, VI and VII were selected at random. The inter-correlations

3. Anne Anastasi, *Psychologic Testing*, (New York : The McMillan Company, 1961), p. 147.

between the sub-tests were computed by product moment method and then the correlation matrix for each test was prepared.

Extraction of Factors

The factor analysis of the present tests was carried out by the Thurstone centroid method. In the present data the communalities of the tests are not known. Therefore they may be estimated from the data at hand. One simple method of estimating the communality is to guess it to be equal to the highest correlation of the test with any other variable in the correlation table.¹ In the same way the second factor was extracted and tested for significance by Humphrey's rule. It was found that the second factor was not significant. Therefore it was decided that there is no need to extract the third factor. This is reported hereafter.

Table 5.13
CORRELATION MATRIX OF S.I.D. V

Test	1	2	3	4
1		.39	.47	.38
2	.51		.49	.54
3	.41	.49		.47
4	.28	.34	.47	

$$\text{First Factor } \alpha_1 = .574 \quad .715 \quad .710 \quad .704$$

$$\text{Th. 1} = .514$$

FIRST REAL VALUED CORRELATION MATRIX
as Obtained from the Extraction of THE SECOND FACTOR
Correlation of S.I.D. V

Test	1	2	3	4
1	.071	-.056	.035	-.059
2	-.050	.029	-.011	.037
3	.035	-.011	.00	-.023
4	-.059	.037	-.023	.044

$$\alpha_2 = .298 \quad .173 \quad .057 \quad .212$$

Rudolf Yule Rule

The criteria takes into account N_1 the size of the sample and is dependent on the loading of only two variables rather than on the entire matrix. Accordingly (i) the product of the two highest loading, (.6 x .712) = .46 and the standard error of the correlation coefficient of zero (the size $N=100$) = .10.

The product found in step I (.06) does not exceed twice (.10 x 2 = .20) the standard error. Therefore probably the second factor is not significant. Hence it could be said that there is only one significant factor having loadings in all the four sub-tests.

Interpretation of Factor .

It has been reported earlier that the second factor is not significant. Therefore there is only one common factor in all the sub-tests. Besides this, from the proportion of variance contributed by the centroid factor, it could be seen that 93.0% of the total variance has been taken away by the first factor.

Table 5.15
PROPORTION OF VARIANCE CONTRIBUTED BY THE CENTROID FACTORS AND COMMUNALITIES FOR STD. V

Test No.	Factor Loadings:		Factor Variance Communali- ties		
	a^2_1	a^2_2	a^2_1	a^2_2	h^2
1	.624	.198	.38	.08	.46
2	.715	.173	.51	.02	.53
3	.700	.057	.49	.00	.49
4	.704	.212	.49	.04	.53
	a^2_k		1.87	.14	2.01
	%		93.03	6.97	100

The first factor a_1 has the highest loading in sub-test No. 2 which measures the ability to note significant details, and ability to find out relationship between ideas. Test No.

3 and 4 measure the same components as well as the

ability to give the meaning of the words and phrase and sequence of event. Similarly the test no. 1 measures the four properties. Therefore this factor could be called a reading comprehension factor as it runs through all the four sub-tests, and indicates that by and large, all the four sub-tests measure the common factor called reading comprehension, i.e. the first measured factorial validity.

Table 5.16
CORRELATION MATRIX FOR CLASS VI

Test	1	2	3	4
1		.57	.54	.34
2	.57		.76	.47
3	.54	.76		.45
4	.34	.47	.45	
Σ_1	.680	.862	.845	.583

Table 5.17
FIRST RESIDUAL CORRELATION MATRIX
A COMPUTATION OF THE SECOND
FACTOR LOADING OF STD. VI

I	t	1	3	4
1		.141	-.016	-.054
2		-.110	.111	.057
3		-.013	.011	.046
4		-.010	-.013	.049
Σ_2		.251	.216	.182
				.306

The second factor was tested for significance by applying Durbin's rule. Accordingly the product of the two highest loadings ($.141 \times .306$) = .046 and the standard error of the correlation coefficient of zero (the size N=100) = .10. The product of two highest loading that is .076 does not exceed .20 times the standard error of the correlation coefficient. So the second factor is not significant. Therefore it can be said that there is only one common factor which is significant involving in all the four sub-tests.

Interpretation of Factor

As it is said that there is only one significant factor common in all the four sub-tests, it was decided to compute the proportion of variance contributed by the centroid factor. The relevant data are presented in table 5.12.

Table 5.12
PROPORTION OF VARIANCE CONTRIBUTED BY
THE CENTROID FACTOR AND COMPARISONS
FOR SUB. VI

Test No.	Factor loadings		Factor variances		Commonalities h^2
	a_1	a_2	s_1^2	s_2^2	
1	.680	.251	.462	.063	.525
2	.862	.115	.743	.013	.756
3	.845	.182	.714	.033	.747
4	.583	.306	.340	.094	.434
			Σs_k^2	2.259	.203 2.462
			%	91.76	8.24 100

From the proportion of variance contributed by the centroid factor it could be seen that 91.76% of the total variance has been taken away by the first factor.

The first factor a_1 has the highest loading in sub-test No. 1 which measures the ability to note significant details, ability to give the meaning of the words, ability to find out the relationship between ideas, ability to give caption and ability to give sequence of events. Test No. 3 and 4 measure the same components as well as the ability to give the meaning of the words and phrase. Similarly the test No. 1 measures the same components. Therefore this factor could be called a reading comprehension factor as it runs through all the four sub-tests. This indicates that by and large all the sub-tests measure the same common factor-called reading comprehension.

Table 5.19
CONTINUATION OF TABLE VII

	1	2	3	4	5
1	.771	.743	.45	.14	
2	.7	.55	.41	.16	
3	.41	.6	.61	.36	
4	.41	.41	.51		.37
5	.16	.11	.5	.57	
=	.771	.55	.41	.16	.405

TABLE 5.21

PARTIAL CORRELATION MATRIX
A CHECK UP OF THE SECOND
FACTOR PREDICTION OF STD. VII

	1	2	3	4	5
1	.144	.154	-.104	-.084	-.154
2	.151	.152	-.077	-.056	-.169
3	-.111	.052	.015	.024	.035
4	-.144	-.144	.061	.077	.072
5	-.154	-.154	.031	.072	.206

In this case the second factor loading was tested for significance by applying the Ray's rule. Accordingly the product of the two highest loadings ($.446 \times .403 = .179$) was divided by the error or the correlation coefficient of zero ($.446 + .179 = .625$). The product of the two highest loadings divided by the error does not exceed twice the standard error of total trim trit i.e. $.625 / .20 = .3125$. Therefore the second factor is probably not significant. It could be said that there is only one common factor which is significant and having loadings as follows the first, second, third, fourth.

Int. J. Environ. Res. Public Health

As it is felt that there is only one significant factor common in all the five sub-tests, it was decided to compute the proportion of variance contributed by the centroid factor. The

relevant data are presented in table 5.21.

Table 5.21
PROPORTION OF VARIANCE ATTRIBUTED BY THE
CENTROID FACTOR AND COMPARISONS FOR
TEST NO. VII

Test No.	Factor	Proportion of variance		Comparisons	
		1	2	1	2
1	.725	.440	.520	.194	.720
2	.795	.2	.632	.110	.742
3	.503	.151	.644	.017	.661
4	.737	.232	.543	.054	.597
5	.405	.408	.164	.027	.191
$\alpha^2_K =$		2.509	.402	2.91	
%.		86.19	13.81		100

From the proportion of variance contributed by the centroid factor it could be seen that 86.19% of the total variance has been taken away by the first factor.

The first factor a_1 has the highest loading in test No. 3 which measures the ability to give significant details, ability to give the meaning of the words ability to find out the relationship between ideas and ability to give the sequence of events. Similarly test No. 2, 4 and 1 measure the same component as well as the ability to give caption. Test No. 5 measures the word and phrase meaning. Therefore, it could be said that there is one factor common in all sub-tests and it is reading comprehension. Thus, all the three tests have good factorial validities.

DEVELOPMENT OF SOCIO-ECONOMIC STATUS SCALE

In view of the varied socio-economic scales the present have to or he has to construct their own scale for measuring socio-economic status of the people. Because of the above account it can be understood that changes are taking place in society from time to time. Before some years to have a radio in the house was considered to be a prestige. But at present it is not so much a prestige. Similarly to have a television set in the house was also considered to be a prestige but now it cannot be so. Therefore, the items that were considered as prestige some years back have now become the non-activity of life. If the salary of the person has increased then there is no increment in D.S. All these factors led the investigator to construct a new scale for measuring socio-economic status.

Before constructing the scale, it was necessary to go through the existing scales. The following scales were primarily used:

1. Lewis Scale which was modified by Satyakumar.
2. Socio-economic scale by B. Kuppuswamy.
3. Mr. A.M. Patel's scale of S.E.S.

The above scales were selected from the view point of finding out the extent up to which the items could be coined. As in the case of the first two, the next revision or replacement of the scale will be the effort to be given to them.

Development of Scale

After studying the existing scales, it was decided to construct it in the following aspects:

- Family interpretation.
- Education of the members of the family.
- Income of the family members and property.
- Household equipments.
- Residential accommodation.
- Household equipments.
- Social facilities.

Under each aspects items pertaining to that aspect which directly or indirectly reveal the social status are included.

Under the first aspect that is family information eight items are included namely joint family or unit family, number of brothers and sisters, number of brothers and sisters elder than himself or herself. This is just to have information about the size and type of the family.

Educational qualifications : Under this heading the students have to write the educational qualification of their father, mother, brother and sister.

Family Income : Under this aspects the income of the father, mother, brother and sisters have been included together with the income from other sources such as income from land, factory, shop and rented buildings. A sub-question about the number of vaghs of land the family has, is also included in this aspect. Further a question pertaining to the vehicle they keep at home has also been put which includes vehicle like, cycle, motor cycle, scooter, car, jeep etc.

Questions pertaining to the residential accommodation such as they have their own house or rented one. The number of rooms the house has etc., have been included under this aspect.

A sub-section of this aspect includes questions pertaining to the house hold equipments and other facilities such as refrigerator, air-conditioner, gas, washing machine, television, camera, radio etc., along with the facilities for reading.

After constructing this scale, a group of college teachers, particularly working in teachers' college was invited to decide upon the weightage to be given to each aspects and items included in each aspect. Five members were invited for this work. Each member was given with the typed copy of the pilot form of the scale. One by one the aspect and items were taken for discussion and deciding the weightage say for example joint family be given 1 mark and unit family be given 2 marks. In this way the weightage was decided jointly by the panel of judges. The scale is given underunder .

EDUCATIONAL STATUS SCALE

1. Age _____ Status _____
 2. Sex _____ Age _____
 3. Religion _____
 4. Cast _____ Place _____

Family Index 100

1. Are you living in joint family or unit family?
2. How many brothers are there in your family?
3. How many sisters? _____ How many sisters? _____
4. How many brothers are older to you?
5. How many brothers are younger to you?
6. How many sisters are older to you?
7. How many sisters are younger to you?
8. How many relatives except your brothers and sisters are at home in your family?

Education & Economic status of Family Members

1. Father/Guardian
2. Mother
3. Brother
4. Sister

Income of the family member (Yearly)

1. Income of the father. _____
2. Income of the mother. _____
3. Income of brother or brothers. _____
4. Income of sister or sisters. _____

Income from other sources:

1. Income from farm. _____
2. Income from factory. _____
3. Income from shop. _____
4. Income from rented house. _____

Do you possess land? Yes/No.

If yes, then how many vildas: _____

Information about the vehicle

Which of the following vehicle you have?

- | | |
|----------------|--------------------|
| 1. Cycle | 4. Car _____ |
| 2. Motor cycle | 5. Jeep _____ |
| 3. Scooter | 6. Any other _____ |

Do you keep any of the following vehicle for giving them on rent'l basis?

- _____ 1. Rickshaw _____ 3. Bullock cart _____ 5. Tanga
_____ 2. Taxi _____ 4. Auto rickshaw _____ 6. Bus
_____ 7. Truck

Residential Accommodation

Do you live in a government house? Yes/No

Do you live in a private house? Yes/No

Do you have your own house? Yes/No

Do you live in a rented house? Yes/No

If you are living in a rented house what is the monthly rent? _____

How many rooms are there in your house? _____

Put a tick mark / against the things you have in your house.

- _____ 1 Electric flour mill. _____ 8 Sofa cum bed
_____ 2. Hairdryer _____ 9 Sofa set
_____ 3. Air conditioner _____ 10 Dining table
_____ 4. Solar cooker _____ 11 Steel cup-board
_____ 5 Gas _____ 12 Wooden cup-board
_____ 6 Washing machine _____ 13 Table and chair
_____ 7 Dunlop mattresses _____ 14 Radio
_____ 15 Tape recorder
_____ 16 T.V.
_____ 17 Camera

Reading Arrangement

1. Do you have your own library? Yes/No

2. Do you get daily news paper? Yes/No

3. If yes, give the name of the news paper _____

4. Do you get monthly or fortnightly magazine to read? Yes/No
If yes, give the name of the magazine _____.

The scale is still under the process of standardization. But it is used in the present research project on the basis of the opinion of the panel of judges. After deciding the weightage of each item, the scale was printed for use. It is also being used by M.Ed. and Ph.D. students of the Department of Education, Sardar Patel University, Vallabh Vidyanagar.

CHAPTER VII

READING IMPROVEMENT PROGRAMME

This chapter deals with the preparation of reading improvement programme (RIP). By examining the definitions of reading, it could be stated that reading is nothing but an act of understanding. The study of the earlier researches have discovered that reading could be improved and for this one of the tools is the reading improvement programme. Therefore, it will not be out of place if the definition and meaning of RIP are examined. Here in this part is made to study a few definitions.

Meaning of Reading Improvement Programme (RIP).

The RIP is the basic tool for improving the reading and the level of comprehension of pupils.

According to Fry Edward : "One of the major methods of improving both speed and comprehension is to set the student to work through a series of timed reading passages followed by comprehension questions".¹

According to Henry H. Smith and Emerald V. Dechant, the meaning of RIP could be stated in the following points :

1. The RIP involves differentiated instruction to meet the needs of each child, but it does not ignore the commonality of needs, interests and abilities among children.
2. The RIP looks upon reading, as a perceptual process rather than as a subject.
3. The RIP is a tool which conceives reading for understanding, not thinking, and aims to develop critical skills and flexibility in comprehension and rate in accordance with the pupil's abilities and purposes and difficulty level of the material.
4. The RIP allows each pupil to progress at his own rate of his maximum capacity.

1. Edward L. Fry, Techniques of Faster Reading, Cambridge : Cambridge University Press, 1953, p. vii.

- The RIP seeks to develop reading maturity.²

From these points, it could be concluded that:

1. the RIP must include exercises on a perceptual process,
2. the RIP should also include exercises for improving eye-spar and word recognition span with a view to increasing the speed of reading,
3. the RIP should also include exercises for increasing vocabulary, as comprehension largely depends upon vocabulary,
4. It should be flexible so that pupils can work according to their speed and capacity.
5. It should also include exercises for reading paragraphs and answering questions of comprehension based upon them.

These points were taken into consideration while preparing the RIP.

The RIP - it is a common programme, based upon the common needs of the pupils to improve reading comprehension. Therefore it was thought to include exercises to improve the following aspects of reading comprehension.

- | | |
|----------------------------|----------------------------|
| 1. Word perception | 5. Sentence comprehension |
| 2. Word recognition | 6. Column reading |
| 3. Vocabulary | 7. Paragraph comprehension |
| 4. Word and phrase meaning | |

The investigators focussed their work on pupils of classes V, VI and VII. Naturally the pupils of these classes should have the "lexical level" of comprehension, which generally have the following components of reading comprehension.

1. to understand the meaning of the word and phrase,
2. to answer the questions based on the reading material,
3. to arrange the events or ideas in sequential order and
4. to follow the written instructions.

2. Henry P. Smith and Dechant, *Psychology in Teaching Reading*, Englewood Cliffs, Prentice Hall Inc., 1961, pp. 379-380.

Therefore, the KII that is to be prepared should aim at incorporation the components necessary to develop the lexical level of comprehension.

The First Part - Perception

The first part is aimed on perception, without the ability of perception the student will not reach his full potential for unlocking the treasure chest of books filled with knowledge, pleasure and relaxation. There are seven exercises based on perception. They are as under for class V.

Two exercises for number perception. The first is of three digits, the second is of four digits. Thus these two exercises are graded with a view to developing eye-span of pupils too. Three exercises are for letter and nonsense syllables. These exercises are also graded one that is they are in increasing order of 1 tier. These too are meant for developing eye-span. Two exercises are for word perception. These exercises are also graded one.

These exercises are meant for developing eye-span thereby to increase the speed of reading. It is expected that these exercises would increase the speed of reading. In the first column the number is the letter or the word or group of letters given. I will have to carefully study this and have to find out the same from the rest of the four columns which by and large work as indicators. This part they have to do it rapidly as they can do it.

The Second Part - Vocabulary

This part is meant for increasing the vocabulary of the pupils. Looking to the importance of vocabulary in reading more emphasis be given to this component. There are nine exercises in this part. All are meant to develop and build vocabulary of pupils. Two types of exercises are there in this part. One for word meaning and the other is for giving one word for a phrase.

Two types of exercises are provided for developing the ability to find out the meaning of the word. In the first type

the pupils are required to find out the synonyms of given words. In the second type they are required to find out the antonyms. Three exercises are given for building words from the given letters.

The Third Part - Comprehension

This part is meant for comprehension. Only the knowledge of the word meaning is not enough. Next to the word the basic unit of reading material is a sentence. Though the sentence is a meaningful group of words each word may have a different meaning when used with other words. Therefore it is quite necessary that pupils should be able to find out the correct meaning of the sentence that is they must be able to comprehend the sentence. Therefore one exercise has been given for comprehending the sentence. Each sentence is followed by four questions beginning with what, which, than, who and where. The pupils are to be instructed to read each sentence as quickly as possible and answer the questions given below the sentence. They have to do this for all sentences one by one.

Besides this, this part also contains exercises for column reading. Column reading is essential for increasing the speed of reading. This is the way of increasing the number of words that an individual can take into a single phase of eyes. Therefore to provide this practice column reading is given to improve eye-sight and to expand the eye-span, and ultimately the reading speed. Three passages are given for column reading practice. These exercises are for paragraph and story comprehension. Each paragraph and story is followed by multiple choice type of questions. These questions aim at finding out the ability.

- i. to give significant details,
- ii. to give correct meaning of the words and
- iii. to give sequence of events

The pupils are to be instructed to read each exercise with their maximum speed and to answer the questions given below it.

In short the exercises of RIP are arranged according to the different difficulty level that is from easy to difficult, from word perception to paragraph and story comprehension. The sequence of components of reading in the form of exercises is arranged in this way because 'perception' is the element of the process of reading. Without this process, one cannot get the product, that is comprehension. The comprehension is based on the ability of perception and vocabulary.

Similarly the RIRs for pupils of class VI and VII were prepared. The only difference is in the number of exercises included in the programme.

Developing Reading Comprehension through the use of Text-Books

The text-book is used to teach language in the class-room. It is presumed that the materials given in the text-book are in tune with the pupils' ability to comprehend.

Prose and poems are generally selected keeping in view the literary material for a particular class. This in turn is divided into syllables or letters keeping in view the age, stage and ability of the pupil. The reading material so compiled is taught to the pupils in the class. For developing reading comprehension through the use of text-book the following procedure are observed by the teacher in the class-room.

The teacher should first ask a few questions on the prose that he is going to teach in the class. He should write down the questions on roll up black board and should take the board in his hands. He then instructs the pupils to read the questions written on roll up board. He then asks the pupils to open the book and read the lesson from the book to find out the answers to the question. The students are asked to write the answers in their notebook. The teacher then should discuss the answer of the questions. He should also get the answer checked by fellow student. The teacher should then read the prose and start teaching the lesson. While teaching he should also bring to the notice a new words or phrase. He should give the meaning of the word and the opposite of it. At times he should also encourage the students to use the new words in their own sentences.

CHAPTER VIII

EXPERIMENTAL DESIGN

In the previous chapter the preparation of reading improvement programme has been discussed in sufficient detail. After finalising the programme for classes V, VI and VII the necessary copies were got printed. The material thus prepared is ready to be implemented in schools to see how it works and whether any change in reading comprehension and speed of reading as a result of the programme could be observed. This means that the chief objectives of implementing these materials is to study their effectiveness on reading comprehension, and speed of reading of pupils of classes V, VI and VII. Therefore, there is a need of carrying out an experiment. Prior to the experimental design it is first of all necessary to formulate the hypotheses.

Hypotheses

It was decided to formulate the following hypotheses for the present experimental study, which could be tested statistically.

- H_0_1 There will be no difference between the mean scores made on reading comprehension test made by pupils of Stds. V, VI and VII who take the Reading Improvement Programmes of Stds. V, VI and VII and those who do not take such programmes.
- H_0_2 There will be no difference between the mean scores made on rate of reading tests by pupils of Stds. V, VI and VII who take the Reading Improvement Programmes of Stds. V, VI and VII and those who do not take such programmes.

The three methods which are mostly used in educational experiment are : (i) One group method (ii) Parallel or equivalent group method and (iii) Rotational Group method. Out of these three methods, the second method has been contemplated for the present experiment.

Sample of Schools

It was thought to select schools in such a way that as far as possible representative sample of pupils studying in classes V, VI and VII could be procured for the purpose, without which the result would not be reliable and valid. Therefore six schools from Aravali taluk were selected keeping in view the following point :

- i. Strength of the schools
- ii. Location of the schools
- iii. Type of schools whether boys', girls' or mixed schools.

As the experiment was to be carried out in schools located in rural area, the schools from rural area were selected. Only the strength and type of the schools were taken into consideration. Here again only mixed schools were selected as sample. The students so selected could be considered as representative sample as well as randomized sample because in schools pupils are generally admitted on the 'first come first served' basis. This condition prevails in almost all schools in rural area. Again there is also no definite criteria for the formation of divisions of Stds. V, VI and VII. Therefore, it could be said that by and large the pupils are allotted to different divisions of classes at random. This led to say that there is a natural randomization of students in the group or class itself.

Besides this, the sample could also be considered as representative of the population because of the fact that the primary education in the state of Gujarat is free. Therefore . . . the children in all strata of the society attend the school. Under this circumstances the pupils of Stds. V, VI and VII belong to different castes and sub-castes of all religion of all income groups and of both the sexes of varying ability. From this discussion it could be said that the sample is quite representative to the total population of pupils of rural area.

Formation of Experimental and Control Group

Six schools were selected from the rural area of Anand taluka. Out of these, three schools were treated as experimental schools and three were treated as control schools. One division of V, VI and VII from each school was taken at random. Thus, there were nine divisions of each standard that is of V, VI and VII. Out of these six divisions, 3 divisions of each standard were treated as experimental and 3 as control.

Steps of the Design

In order to ascertain whether the exercise for improving reading comprehension (RI) would prove effective, the following steps would be taken :

- i. Test the groups on the dependent variable (reading comprehension) and find the mean of the pre-test scores for the experimental and control groups (T1E for experimental and T1C for control).
- ii. Keep all the conditions identical for the groups except for exposing the experimental group to reading improvement programme and the control group to usual work in the class.
- iii. Test the groups on dependent variable and find the mean of the post test scores (T2E and T2C).
- iv. Compare the mean to determine whether the application of X caused a significant change in the experimental group as compared with the control group.
- v. Apply the appropriate statistical procedure to ascertain whether the difference in scores is sufficiently great to be a real difference or whether it is only a chance occurrence.

These steps were followed with all possible precautions required for conducting the experiment.

Conduct of the Experiment

The experiment was carried out from the third week of September, 1983 to October 1, 1983 on the students of experimental group with the help of the teachers teaching Gujarati in classes V, VI and VII of that particular school. The conduct of the experiment consisted of the following steps :

1. Training to be given to the experimenting teachers.
2. Treatment to be given to the groups.
3. Administering the tests before beginning of the experiment and at the end of the experiment.

1. The Training of Teachers

Before starting the experiment it was decided to give training for implementing the material prepared for improving reading comprehension. First the head masters of the experimental schools were invited to discuss the implementation aspects of the RIP. Also it was discussed and decided with head masters that one day workshop will be organised to acquaint and train the participating teachers. Accordingly one day workshop was organised for teachers of the experimental schools teaching Gujarati in classes V, VI and VII. The teachers were first acquainted with the objectives of the experiment and what is to be implemented in the class room. Besides this actual demonstration of taking the exercises of the RIP were given so that they can implement the programme in the right way. Lastly the teachers were also acquainted with the procedure of a test book for developing reading comprehension as discussed elsewhere in this report.

Treatment given to Groups

The students of the experimental groups of classes V, VI and VII were given a reading improvement programme. For this, three periods a week were allotted for taking the exercises from the reading improvement programme under the supervision of the teacher. During all, the teachers were also using text-book for developing reading comprehension in pupils. The students have to take exercise at least for three times. This was done with view to increasing the speed in reading.

The researcher followed up to visit the school when the experiment is going on. This was essential and was done with a view to providing guidance on the spot. Before commencing the actual experiment the pre-testing work was carried out. Pre-testing work was carried out with a view to studying their initial position in speed of reading and reading comprehension ability. At the end of the experiment the same criterion test was administered to both control and experimental groups. Besides this, the SLS scale was administered to both the groups to know the effect of SLS on their acquired skills on speed and comprehension ability at the end of the experiment.

As it is discussed that in the present project the parallel group technique for measuring efficacy of the RIF was used. The groups were matched for means on the pre-testing scores of criterion tests. It is accepted fact that if the difference between two means is well within the limits of random variation and not differing significantly, the groups are considered to be matched.

In social science experiments, it is really stupendous task to have identical pairs for forming the parallel groups. In school experiments if "research" employs rigorous procedure for selecting identical pairs it causes a lot of inconvenience to the infrastructure of the schools included in the experiments. Hence selection of intact class for experiment is advisable and to control the error occurring due to this could be checked within the limit. For this, the analysis of covariance statistical method is used. Garrett has strongly recommended ANCOVA in this circumstances:

"Covariance of analysis is especially useful when for various reasons it is impossible or quite difficult to equate control and experimental groups at the start : a situation which often obtains in actual experiments".¹

1. H.E. Garrett. Statistics in Psychology and Education, Bombay : Vakils Faffer and Simons Pvt. Ltd. 1967. p. 295.

George Louly also has advised the use of Analysis of Covariance in such circumstances to check the possible errors.

"This technique, permits statistical adjustments to be made in the dependent variable in order to compensate for any lack of equivalence between the groups in the independent variable(s)."²

Jones, reported, recommended the use of covariance to consider intact groups as based on mean performance on pre-testing:

"This powerful technique allows the researcher to statistically equate the independent variable groups with respect to one or more variables which are relevant to the dependent variable, analysis of covariance allows the researcher to study the performance of several groups which are unequal with regard to an important variable as though they were equal in this respect."³

In the light of the above discussion, the investigators decided to use 'Ancova' statistical technique to overcome any hidden possible error in equating the groups on the basis of mean performance of the pre-testing.

In order to have equal number of observations in experimental and control groups the process of randomization was adopted for all the treatments. The analysis of the data for different treatments came after the other. The equal number of observations is preferable to have an advantage of inhibiting heterogeneity of variance.

Albert Allen (* 60)⁴ has clearly mentioned quoting Box (1953) that the t -test in the analysis of variance is quite insensitive to heterogeneity of variance, provided there are equal number of observations for each group.

-
2. Geoty, S. Louly, "Science of Educational Research", New Delhi : Eurasia Publishing House (Pvt.) Ltd. 1964, p. 344.
 3. J. Jones, "Practical Statistics", New York : Harper & Row, 1967, p. 143.
 4. W. G. Cochran, "Elementary Survey Sampling", Psychological Corporation, New York, 1965, Hafner Publishing Co. Pvt. Ltd., p. 746.

Interpreting of Reading Comprehension of Std. V

On the basis of scores made by students of std. V of experimental and control groups on Reading Comprehension tests, (μ -test), Σx , Σx^2 , \bar{x} and n were worked out. They are presented in table 8.1.

Table 8.1
 $\{\Sigma x, \Sigma x^2, n$, AND \bar{x} ON THE BASIS OF THE SCORES OF READING COMPREHENSION OF BOTH THE GROUPS (OF STD. V)

Group Symbols	Experimental	Control	Total
Σx	2275	2375	4648
Σx^2	57905	59826	117731
n	100	100	200 ✓
\bar{x}	22.75	23.75	23.24

It is observed from table 8.1 that means of both the groups on reading comprehension are very close. However there is a difference of 1 point. In order to see whether this difference is real or not analysis of variance was worked out. On the basis of the statistical figures furnished in table 8.1 the summary of analysis of variance is presented in table 8.2.

Table 8.2
 SUMMARY OF ANALYSIS OF VARIANCE OF READING COMPREHENSION SCORES OF MUL-TTESTING OF EXPERIMENTAL AND CONTROL GROUPS OF STD. V

Source of Variation	Sums of squares	d.f	M.s.	F
Between groups	48.02	1	48.02	.98
Within groups	9663.46	198	48.80	
Total	9711.48	199		

With df 1 and 198 F .05 = 3.91 and F .01 = 6.81

P > .05

It is observed from table 8.2 that the F ratio does not reach upto the table value of F at .05 level of significance. Hence the difference is not significant. Consequently it is

proved that both the groups are equal on reading comprehension at the initial stage of the experiment.

Pre-testing of Reading Comprehension of Std. VI

On the basis of the reading comprehension scores on pre-test, the students of std. VI of experimental and control group, were matched. The primary statistics is presented in table 8.2.

Table 8.3

Σ, ΣX^2 , N, AND \bar{X} ON PRE-TESTING SCORES OF READING COMPREHENSION OF BOTH THE GROUPS OF STD. VI

Groups Symbol	Experi- mental	Control	Total
Σx	2724	2768	5492
Σx^2	83718	84898	168616
n	100	100	100
\bar{x}	27.24	27.68	27.46

It is observed from table 8.3 that the mean difference between experimental and control groups is .44 which is quite negligible. Though the difference is small it was subjected to statistical significance. On the basis of statistical figures furnished in table 8.3, the summary of Anova was worked out which is presented in table 8.4.

Table 8.4

SUMMARY OF ANALYSIS OF VARIANCE OF READING COMPREHENSION SCORES ON PRE-TESTING OF EXPERIMENTAL AND CONTROL GROUPS OF STD. VI

Source of variation	Sums of squares	d.f	M.S.	F
Between groups	9.68	1	9.68	.11
Within groups	17796.00	198	89.88	
Total	1785.68	199		

With dF 1 and 198 F .05 = 3.91 and F .01 = 6.81

P > .05

It is observed from table 8.4, that the F ratio falls too short to reach upto the table value of F at .05 level of significance. Hence the difference is not significant. Consequently it is proved that both the groups are equal on reading comprehension at the initial stage of the experiment.

Similarly on the basis of the reading comprehension scores on pre-test the student of std. VII of experimental and control groups were matched. The primary statistics was worked out. It is presented in table 8.5.

Table 8.5
 Σx , Σx^2 , N, AND \bar{x} OF PRE-TESTING SCORES OF
 READING COMPREHENSION OF BOTH THE GROUPS
 OF STD. VII

Groups Symbols	Experi- mental	Control	Total
Σx	3685	3590	7275
Σx^2	152699	139112	291811
n	100	100	200
\bar{x}	31.85	35.90	36.38

It is observed from table 8.5 that the mean difference between experimental and control groups is .95 which is quite negligible. Though the difference is small it was subjected to statistical significance. On the basis of the statistical figures furnished in table 8.5, the summary of Anova was worked out which is presented in table 8.6.

Table 8.6
 SUMMARY OF ANALYSIS OF VARIANCE OF READING COMPRE-
 HENSION SCORES ON PRE-TESTING OF EXPERIMENTAL AND
 CONTROL GROUPS

Source of variation	Sum of squares	d.f.	M.S.	F
Between groups	45.125	1	45.125	.33
Within groups	27137.75	198	137.059	
Total	27182.875	199		

with df 1 and 198 F .05 = 3.91 and F .01 = 6.81

P > .05

The table 8.6 reveals that the F ratio is quite negligible and does not reach upto the table value of F at .05 level of significance. Hence the difference is not significant. Consequently, it is proved that both the groups are equal on reading comprehension at the initial stage of the experiment.

From the above discussions it is proved beyond doubt that initially the three standards, the experimental and control groups were equal on pre-criterion-testing at the initial stage of the experiment.

Pre-testing of Rate of Reading (R.W.L of students of Std. V)

On the number of words read per minute by the students of experimental and control groups, the primary statistics such as Σx , Σx^2 , n and \bar{x} were worked out. It is presented in table 8.7.

Table 8.7
 Σx , Σx^2 , n , AND \bar{x} OF PRE-TESTING ON RATE OF READING PER MINUTE OF EXPERIMENTAL AND CONTROL GROUPS OF STUDENTS OF STD. V

Groups	Experimental	Control	Total
Symbols			
Σx	11147	9613	19766
Σx^2	174145	1047011	2171956
n	100	100	200
\bar{x}	111.47	96.19	98.83

It is observed from table 8.7 that means of both the groups i.e. rate of reading per minute are very close. However there is a difference of 5.28 words per minute. To find out whether the difference is real or not analysis of variance was worked out. On the basis of the figures furnished in table 8.7, the summary of ANOVA was prepared which is presented in table 8.8.

Table 8.8

SUMMARY OF ANOVA OF RATE OF READING P.R. MINUTE
OF BOTH THE GROUPS OF STD. V

Source of Variation	SUM OF SQUARED	D.F.	M.S.	F
Between group	15' 3.71	1	1393.97	
Within groups	217088.50	198	1096.41	1.27
Total	218452.22	199		

With df 1 and 198 F.05 = 3.89 and F.01 = 6.76

$$F > .05$$

The study of table 8.8 reveals that the F ratio of 1.27 does not reach upto the table value of F at .05 level of significance. Hence the apparent difference of 5.2 words per minute is not significant. This led to conclude that both the groups were, by and large equal on rate of reading per minute at the initial stage of the experiment.

Interpretation of Rate of Reading of students of Std. VI

On the number of words read per minute by the experimental and the control groups, the primary statistics such as $\sum x$, $\sum x^2$, n and \bar{x} were worked out. It is presented in table 8.9.

Table 8.9
 $\sum x$, $\sum x^2$, N AND \bar{x} OR F.R.-TESTING ON RATE OF
READING P.R. MINUTE OF BOTH THE GROUPS OF
STD. VI

Groups Symbol	Experi- mental	Control	Total
$\sum x$	13431	13977	27408
$\sum x^2$	2023047	2163141	4187088
n	100	100	200
\bar{x}	134.31	139.77	137.04

It is observed from table 8.9 that means of both the groups of rate of reading per minute are very close to each other. However there is a difference of 5.46 words per minute. To find out whether the difference is real or not, analysis of variance was worked out. On the basis of the figures furnished in table 8.9, the summary of ANOVA was prepared which is presented in table 8.10.

Table 8.10

SUMMARY OF A ONE WAY ANALYSIS OF VARIANCE PER MINUTE
OF READING RATE OF STUDENTS OF STD. VI

source of variation	sums of squares	d.f.	M.S.	F
Between groups	1490.58	1	1490.58	
Within groups	41605.10	199	2169.72	00.68
Total	43105.68	199		

With df 1 and 199, $t = 5.46$ and $F = 6.70$, $P > .05$

The study of table 8.10 reveals that the F ratio of .68 is too small to be significant at .05 level of significance. Hence the apparent difference of 5.46 rate of reading per minute is not significant. Consequently it is proved that both the groups are equal on rate of reading per minute at the initial stage of the experiment.

Interpretation of Rate of Reading of students of Std. VII

On the basis of number of words read per minute by the experiment I and control I group, the primary statistics such as Σx , Σx^2 , n and \bar{x} or PRE-TESTING ON RATE OF READING PER MINUTE IN BOTH THE GROUPS OF STD. VII.

Table 8.11

 Σx , Σx^2 , n AND \bar{x} OR PRE-TESTING ON RATE OF READING PER MINUTE IN BOTH THE GROUPS OF STD. VII.

Group	Experiment	Control	Total
Σx	150.28	147.28	297.56
Σx^2	133.100	232.963	470.063
n	100	100	200
\bar{x}	150.28	147.28	148.78

It is observed from table 8.11, that means of both the groups of rate of reading per minute are very close to each other. However there is a difference of 3.00 words per minute. To find out whether the difference is real or not ANOVA was used. On the basis of the figures furnished in table 8.11, the summary of ANOVA was prepared which is presented in table 8.12.

Table 8.12

SUMMARY OF ANOVA OF RATE OF READING PER MINUTE
OF BOTH THE GROUPS OF STUDENTS OF STD. VII

source of variation	Sum of squares	d.f.	M.S.	F
Between groups	450.00	1	450.00	00.32
Within groups	280510.37	198	1416.72	
Total	280960.37	199		

With df₁ = 1 and df₂ = 198 $F .05 = 3.89$ and $F .01 = 6.76$
 $F > .05$

It is observed from table 8.12, that the F ratio of .32 is too small to be significant at .05 level of significance. Hence the apparent difference of 3.00 words per minute is not significant. Consequently it is proved that both the groups are by and large equal on rate of reading per minute at the initial stage of the experiment.

From the above discussions on analysis of pre-test scores of rate of words read per minute by the students of experimental and control groups of stds. of V, VI and VII, it is observed that both the groups of each standard are equal at the initial stage of the experiment.

Impact of Reading Improvement Programme on pupils of Std. V on Reading Comprehension

From the scores on criterion test of reading comprehension taken at the initial and the final stages of the experiment of both the groups, the primary statistics was prepared. It is presented in table 8.13.

Table 8.13

SUM, MEAN AND SD OF CRITERION TESTS AT THE INITIAL STAGE (PRE-TEST) AND FINAL STAGE (POST-TEST) ON READING COMPREHENSION SCORES FOR EXPERIMENTAL AND CONTROL GROUPS OF STD. V

Groups	n	Post-Test scores		Pre-Test scores	
		y	\bar{y}	x	\bar{x}
Experimental	10	230	(28.09)	2275	(22.75)
Control	10	2438	(24.38)	2373	(23.73)
Total	20	5747	(25.24)	4648	(23.24)

For calculation of covariance, the necessary statistics such as sum of squares and cross-products for both the groups on reading comprehension scores were worked out from the raw data. They are presented in table 8.14.

Table 8.14

SUMMARY OF COMPUTED PRE-SCORES AND CROSS-PRODUCTS ON READING COMPREHENSION SCORES OF 20 STUDENTS OF STD. V

Measure	Symbol	Total for the entire sample
Post-test scores	Σy^2	148407
Pre-test scores	Σx^2	117731
Cross-products of Pre- and post-test scores	Σxy	129218

With the help of statistical data from tables 8.13 and 8.14 and proper formulae, the values of 'b's for total and within and sum of residuals for total, within and between were worked out. And at a time, the summary of ANCOVA was worked out and is presented in table 8.15.

Table 8.15

SUMMARY OF ANALYSIS OF COVARIANCE ON READING
COMPREHENSION SCORE FOR EXPERIMENTAL AND
CONTROL GROUPS OF STD. V.

Source of variation	d.f.	Residuals	F
		Sum of squares	mean squares
Between groups	1	973.7377	973.74
Within groups	197	4319.9275	21.93
Total	198	5293.6650	

with d.f. 1 and 197 F .05 = 3.91 and F .01 = 6.81

P < .01

- i. Value of b for within .77
- ii. Correction term $\pm .38$
- iii. Adjusted mean(\bar{y}) for experimental : 27.71
- iv. Adjusted mean(\bar{x}) for control : 24.76

It is observed from table 8.15 and necessary information furnished below it, that the F ratio for adjusted means is 44.11 which far exceeds the table value of F at .01 level of significance. Therefore the difference between means of control and experimental groups at the post-test is significant. And hence the null hypothesis is rejected. It could be concluded by comparing adjusted means with the observed means of experimental and control groups for post-test that there is a difference of $\pm .38$ in the means of both the groups. The difference is quite negligible. This is due to the fact that the groups were initially matched for means and variances of the distribution scores on control variable i.e. on criterion test. However by matching and by correcting the errors with the help of ANCOVA technique the groups at the initial stage of experiment were equal beyond any doubt. It could be further said that the significant difference between adjusted means is highly significant and is in favour of the experimental group which has taken the Reading Improvement Programme treatment. Consequently, it could be said positively that the observed significant gain in reading comprehension abilities in experimental group is exclusively due to the effectiveness of the prepared reading improvement programme for std. V.

Impact of reading Improvement Programme on Reading Comprehension of pupils of Std. VI

From the scores on criterion test of reading comprehension taken at the initial and the final stages of the experiment of both the groups, the primary statistics was prepared. It is presented in table 8.16.

Table 8.16

SUMMARY OF MEAN AND SD OF CRITERION TEST AT THE INITIAL STAGE (PRE-TEST) AND FINAL STAGE (POST-TEST) ON READING COMPREHENSION OF STUDENTS FOR EXPERIMENTAL AND CONTROL GROUPS OF STD. VI

Group	n	Post-test scores		Pre-test scores	
		y	\bar{y}	x	\bar{x}
Experimental	100	4096	(40.96)	2724	(27.24)
Control	100	2745	(27.45)	2768	(27.68)
Total	200	6841	(34.21)	5492	(27.46)

For calculation of 'b' value, the necessary statistics such as sum of squares and cross-product of scores for both the group on reading comprehension were worked out from the original data. They are presented in table 8.17.

Table 8.17

SUMMARY OF MEAN RAW SCORES AND CROSS-PRODUCTS OF READING COMPREHENSION SCORES OF 200 STUDENTS OF STD. VI

Measure	Symbol	Total for the entire sample
Sum of t-test scores	Σy^2	271941
Sum of pre-test scores	Σx^2	168616
Cross-product of Pre- and Post-test scores	Σxy	200620

With the help of statistical data from tables 8.16 and 8.17, using proper formulas, the values of 'b' for total as well as within and between residuals for total, within and between were worked out. And from these, the summary of ANCOVA was obtained. It is presented in table 8.18.

Table 8.18

SUMMARY OF ANALYSIS OF COVARIANCE ON READING
COMPREHENSION SCORES FOR EXPERIMENTAL AND
CONTROL GROUPS OF STD. VI

Source of variation	D.F.	Residuals			F
		Sum of squares	Mean square	Number of observations	
Between groups	1	9471.00	9471.00		
Within groups	147	10287.34	97.88		96.76
Total	148	28758.34			

With d.f. 1 and 147 F .05 = 3.91 and F .01 = 6.81

$$P < .01$$

- i. Value of b for within : .73
- ii. Correction term \pm : .161
- iii. Adjusted mean for experimental(\bar{y})= : 40.80
- iv. Adjusted mean for control(\bar{x})= : 27.61

It can be seen from table 8.18 and from necessary informations furnished below it, that the F ratio for adjusted means is 96.76 which far exceed the table value of F at .01 level of significance. Therefore the difference between means of the control and experimental at the post-test is significant. Hence the null hypothesis is rejected.

It could be said by comparing adjusted means with the observed means of experimental and control for the post-test, that there is a difference of $\pm .161$ in the means of both the groups. The difference is quite negligible. This is due to the fact that the groups were initially matched for means and variances of the distribution scores on control variable i.e. criterion test. However by matching and by correcting the errors with the help of ANCOVA technique the groups at the initial stage of experiment were equal beyond any doubt. It could be further said that the significant difference between adjusted means is highly significant and is in favour of the experimental group which has taken the reading improvement programme treatment. Consequently it could be inferred positively that the observed significant gain in reading comprehension in the experimental group is exclusively due to effectiveness of reading improvement programme for Std. VI.

on pupils
Effect of Reading Improvement Programme of Std. VII on
Reading Comprehension

From the scores on criterion test of reading comprehension at the initial and the final stages of the experiment - both the groups, the primary statistics was prepared. It is presented in table 8.19.

Table 8.19

SIXTY, MIDDLE, AND ONE CRITERION TESTS AT THE INITIAL STAGE (PRE-TEST) AND THE FINAL STAGE (POST-TEST) ON READING COMPREHENSION IN THE READING IMPROVEMENT AND CONTROL GROUPS OF STD. VII

Groups	n	Post-test scores		Pre-test scores	
		y	\bar{y}	x	\bar{x}
Experimental	100	4137	(44.37)	3625	(36.85)
Control	100	3774	(37.74)	3590	(35.90)
Total	200	8211	(41.055)	7275	(36.375)

For calculation of covariances, the necessary statistics such as sum of squares and cross-products of scores for both the groups in reading comprehension were worked out from the original data. They are presented in table 8.20.

Table 8.20

SUMMARY OF WORKING SCORES AND CROSS-
 PRODUCT FOR 200 STUDENTS OF STD. VII ON
 READING COMPREHENSION SCORES

Category	Symbol	Total for the entire sample
Criterion test-scores	Σy^2	370283
Control test-scores	Σx^2	291811
Cross-product of crit. rion and control scores	Σxy	321161

With the help of statistical data from tables 8.19 and 8.20, using proper formulas, the values of 'b' for total as well as within, and sum of residuals for total, within and between were worked out. And from these, the summary of ANCOVA work is set. It is presented in table 8.21.

Table 8.21

SUMMARY OF ANALYSIS OF COVARIANCE OF READING
OF PRE-TEST SCORES FOR EXPERIMENTAL AND
CONTROL GROUPS OF STD. VII

Source of variation	D.F.	Residuals		F
		Sq. of Mean square	Squares	
Between groups	1	1714.75	1714.75	
Within groups	197	1802.37	64.99	
Total	198	14517.12		

With D.F. 1 and 197 F .05 = 3.91 and F .01 = 6.81

P < .01

- i. Value of b for within $\approx .82$
- ii. Correction term $\pm .39$
- iii. Adjusted mean for experimental $= 43.98$
- iv. Adjusted mean for Control $= 38.13$

From the table, in the Fig. 8.21 and from the necessary information given just below it, results that the F ratio for adjusted means is 26.94 which far exceeds the table value of F at .01 level of significance. Therefore the difference between means of the control and experimental at the post-test is significant. And hence the null hypothesis is rejected.

It could be perceived by comparing adjusted means with the observational mean of the experimental and the control groups for the post-test, that there is a difference of $\pm .39$ in the means of both the groups. The difference is quite negligible. This is due to the fact that the groups were initially matched for means and variances of scores on the control variable i.e. on criterion test. (The present pre-testing is significantly related with the final achievement). However, by matching and by correction, the errors with the help of ANCOVA technique the groups at the initial stage of experiment were equal beyond any doubt. It could be further said that the significant difference between adjusted means is highly significant and is in favour of the experimental group which has taken the reading improvement programme treatment. Consequently it could be inferred positively that the observed significant gain in reading comprehension abilities in the experimental group is exclusively due to the effectiveness of prepared reading improvement programme for the Std. VII.

Impact of Reading I prominent Programme on pupils of Std. V on Rate of Reading

From the scores on criterion test of rate of reading, held at the initial and final stages of the experiment of both the groups, the primary statistics were prepared. It is presented in table 8.22.

Table 8.22

SUMS, MEAN AND SD OF CRITERION TESTS AT THE INITIAL STAGE (PRE-TEST) AND THE FINAL TEST (POST-TEST) ON RATE OF READING (R.R.) FOR THE EXPERIMENTAL AND THE CONTROL GROUPS OF STD. V

Groups	n	Post-test		Pre-test	
		y	\bar{y}	x	\bar{x}
Experimental	100	129.55	(129.55)	10147	(101.47)
Control	100	99.59	(99.59)	9619	(96.19)
Total	200	22914	(114.57)	19766	(98.83)

For calculation of covariance, the necessary statistics such as sum, of squares and cross-products of scores for both the groups on rate of reading (R.R.) were worked out from the original data. They are presented in table 8.23.

Table 8.23

SUMS, MEAN AND SD OF CRITERION TESTS AND CROSS-PRODUCTS OF THE 200 SUBJECTS OF STD. V ON RATE OF READING (R.R.)

Measure	Symbol	Value for the entire sample
Criterion test (post-test)	$\sum y^2$	2951572
Control test (pre-test)	$\sum x^2$	2171956
Cross-products of criterion and control R.R.	$\sum xy$	2472840

With the help of statistical data from tables 8.22 and 8.23 using proper formulae, the values of 'b' for total and within, 'd.f.'s of ratio 't' for total, within and between were worked out, and from these, the validity of ANCOVA was worked out. It is presented in table 8.24.

Table 8.24

SUMMARY OF ANALYSIS OF COVARIANCE ON RATE OF
READING OF THE STUDENTS OF STD. V OF EXPERI-
MENTAL AND CONTROL GROUPS

Source of Variation	d.f.	Residuals		
		Sum of Squares	Mean Square	F
Between groups	1	31267.9001	31267.90	93.53
Within groups	197	4912.44	4912.13	
Total	198	36179.2445		

With d.f. 1 and 197 $t^2 .05 = 3.91$ and $F .01 = 5.81$

$$F < .01$$

- i. Value of 'b' for within = .92
- ii. Correction term $\pm .243$
- iii. Adjusted mean for experimental : 127.12
- iv. Adjusted mean for control : 102.02

It is observed from table 8.24 and from the necessary information given below it, that the F ratio for adjusted means is 93.53 which far exceeds the table value of F at .01 level of significance. Therefore the difference between means of the control and the experiment on the post-test is significant. And hence the null hypothesis is rejected.

It could be perceived by comparing adjusted means with the observed means of experimental and control groups for the post-test, that there is no difference of $\pm .243$ in the means of both the groups. The difference is quite negligible. This is due to the fact that the groups were initially matched for means i.e. averages of scores on the control variable i.e. on criterion test. However, by matching and by correcting the errors with the help of ANCOVA technique, the groups at the initial stage of the experiment were equal without any doubt. It could be further said that the significant difference between adjusted means is highly significant and is in favour of the experiment I group which has taken the reading improvement programme treatment. Consequently it could be inferred positively that the observed significant gain in rate of reading in the experimental group is exclusively due to the effectiveness of reading improvement programme prepared for the Std. V.

Impact of Reading Improvement programme on pupils of Std. VI
part I on Reading

From the scores on criterion test of Rate of Reading (R.R.) taken at the initial and the final stages of the experiment of both the groups, the primary statistics was prepared. It is given in table 8.25.

Table 8.25

SUMMARY OF APPRAISAL TEST AT THE INITIAL STAGE (PRE-TEST) AND THE FINAL STAGE (POST-TEST) ON RATE OF READING FOR EXPERIMENTAL AND CONTROL GROUPS OF STD. VI

Groups	Pre-test score	Post-test score		Pre-test \bar{x}	Post-test \bar{x}
		y	\bar{y}		
Experimental	100	173.03	(173.03)	134.31	(134.31)
Control	100	141.40	(141.40)	139.77	(139.77)
Total	200	314.43	(157.22)	274.08	(137.04)

For calculation of covariance, the necessary statistics such as sum of squares and cross-products of scores for both the groups on Rate of Reading (R.R.) were worked out from the original data. They are presented in table 8.26.

Table 8.26

SUMMARY OF APPRAISAL SCORES AND CROSS-
PRODUCTS FOR 200 STD. VI ON
RATE OF READING (R.R.)

Procedure	Σy^2	Total for the entire sample
Criterion test	Σy^2	6495.055
Post-test	Σx^2	417.085
Control test	Σxy	4661.655
Cross product of criterion and control R.R.		

With the help of statistical data from tables 8.25 and 8.26, using proper formulae, the values of 'b' for total and within and sum of residuals for total, within and between were worked out. And from these, the summary of ANCOVA was worked out. It is presented in table 8.27.

Table 8.27

SUMMARY OF ANALYSIS OF VARIANCE OF RATE OF READING OF THE STUDENTS OF STD. VI OF EXPERIMENTAL AND CONTROL GROUPS

Source of variation	d.f.	Residuals		F
		Total of squares	Mean square	
Between groups	1	21030.51	26981.51	22.51
Within groups	197	236230.25	1199.18	
Total	198	257267.56		

With d.f. 1 and 197 F .05 = 3.91 and F .01 = 6.81

$$P < .01$$

- i. Value of 'b' for within = .79
- ii. Correction term $t = 2.16$
- iii. Adjusted mean for experimental = 170.87
- iv. Adjusted mean for control = 143.56

It is observed from table 8.27, and from the necessary informations furnished below it, that the F ratio for adjusted means is 22.51 which far exceeds the table value of F at .01 level of significance. Therefore the difference between means of the scores on post-test, given to the control and the experimental group is significant. And hence the null hypothesis is rejected.

It could be seen by comparing adjusted means with the observed mean of the experimental and the control groups on the post-test, that there is a difference of ± 2.16 in the terms of both the groups. The difference is quite negligible. This is due to the fact that the groups were initially matched for means and variances of the scores on control variable i.e. on criterion test. However by matching and by correcting the errors with the help of ANCOVA technique, the groups at the initial stage of experiment were equal. It could be further said that the significant difference between adjusted means is highly significant and is in favour of the experimental group which has taken the reading improvement programme treatment. Consequently it could be inferred positively that the observed significant gain in the Rate of Reading in the experimental group is exclusively due to the effectiveness of reading improvement programme prepared for the std. VI.

Improvement in Reading, Experiment Progr. of pupils of Std. VII, Pre-test & Post-test.

From the scores on criterion test of Rate of Reading, (R.R.) taken at the initial and the final stages of the experiment of both the groups, the primary statistics was worked out. It is as under:

Table 8.28

SUMS, MEANS AND SD OF CRITERION TEST AT THE INITIAL AND FINAL STAGE (PRE-TEST) ON RATE OF READING OF THE EXPERIMENTAL AND THE CONTROL GROUP OF STD. VII

Groups	n	Pre-t		Post-t	
		SD's	\bar{y}	x	\bar{x}
Experimental	100	147.62	(157.82)	15028	(150.28)
Control	100	154.01	(154.01)	14728	(147.28)
Total	200	341.63	(170.92)	29755	(148.78)

For calculation of covariance, the necessary statistics such as sum of squares in cross-product of scores for both the group on rate of reading (R.R.) were worked out from the original data. They are presented in table 8.29.

Table 8.29

SUMS OF SQUARES WORKED OUT CROSS-PRODUCT FROM RATE OF READING OF STD. VII ON RATE OF READING (R.R.)

	BIVARIATE TOTAL for the entire sample	
Criterion test (pre-t-test)	Σy^2	6243425
Control test (post-test)	Σx^2	47080511
Cross-products of criterion and control R.R.	Σxy	5334425

With the help of statistical data from tables 8.28 and 8.29, using proper formulas, the values of 'b' for total and within, and sum of residuals for total, within and between were worked out. On the basis, the nursery of ANCOVA was worked out. It is given in table 8.30.

Table 8.30

SUMMARY OF ANALYSIS OF COVARIANCE ON RATE OF READING OF THE STUDENTS OF STD. VII OF THE EXPERIMENTAL AND THE CONTROL GROUPS

Source of variation	D.F.	Residuals			F
		Sum of squares	Mean square		
Between groups	1	117165.6012	117165.60		
Within groups	197	13739.1237	325.30		
Total	198	18055.2949			

With d.f. = 1 and 197 F .05 = 3.91 and F .01 = 6.81

$$P < .01$$

- i. Value of 'b' for within : .81
- ii. Correction term ± 1.22
- iii. Adjusted mean for experimental : 186.60
- iv. Adjusted mean for control : 155.23

It is observed from tabl. 8.30 and from the necessary information furnished below it, that the F ratio for adjusted means is 325.30 which far exceeds the table value of F at .01 level of significance. Therefore the difference between means of the control and the experimental at the post-test is significant. And hence the null hypothesis is rejected.

It could be perceived by comparing adjusted means with the observed means of the experimental and the control groups for the post-test, that there is a difference of ± 1.22 in the means of both the groups. The difference is quite negligible. This is due to the fact that the groups were initially matched for the initial differences of scores on the control variable i.e. on the criterion test. However by matching and by correcting the errors with the help of ALCOVA technique, the groups at the initial stage of the experiment were equal without any doubt. It could be further said that the difference between adjusted means is highly significant and is in favour of the experimental group which has taken the reading improvement programme treatment. Consequently it could be inferred positively that the observed significant gain in the rate of reading in the experimental group is exclusively due to the effectiveness of the reading improvement programme for Std. VII.

Impact of Reading Improvement Programme on Reading Comprehension in Context of S.E.S.

Introduction

In the studies on treatment of reading improvement programme for the development of reading comprehension abilities in the context of SES for Stds. V, VI and VII, the following procedure was adopted to find out main as well as interaction effects of the treatment and SES independent variables on the development of reading comprehension abilities through reading improvement programme treatment.

Procedure

In the studies there are two independent variables namely SES and treatment and there is one dependent variable namely development of reading comprehension abilities through reading improvement programme treatment. To study the main as well as interaction effects on reading comprehension abilities developed through reading improvement programme, the factorial design was contemplated. The factorial design in such circumstances provides better opportunities for the same than any other designs. It has its own merits and if equal number of observations are selected in each group it guarantees of homogeneity of variance, too.

Since the design demands to divide each independent variable into its possible convenient levels, the SES variable was divided into two distinct levels on the basis of Q measures, and treatment variable was divided into experimental treatment and control treatment as usual. As each independent variable was divided into two distinct levels, a 2×2 factorial design emerged. Thus, the sample was divided into four groups as follows :

- i. Experimental with high SES.
- ii. Experimental with low SES.
- iii. Control with high SES and
- iv. Control with low SES.

In each of the above defined groups 25 observations were randomly selected on reading comprehension scores. The studies are presented one after the other.

(i) Impact of Reading Improvement Programme on Pupils of Std. V on Reading Comprehension in the context of SES

The analysis of observations was carried to test the following hypotheses of the study :

Hypotheses

- i. There is no main effect of treatment (A) on the development of reading comprehension abilities.
- ii. There is no main effect of SES (B) on the development of reading comprehension abilities., and
- iii. There is no interaction effect taking place between Treatment (A) and SES (B) on the development of reading comprehension abilities.

From the scores on criterion tests (final test) on reading comprehension abilities of the four groups, the primary statistics, necessary for multi-way analysis of variance was worked out to study the hypotheses . It is presented in table 8.31.

Table 8.31

ΣX , ΣX^2 , \bar{X} AND N : OBSERVATIONS ON SCORES OF READING COMPREHENSION ABILITIES OF FOUR GROUPS FORMED ON TWO LEVELS OF TREATMENT (A) AND SES (B) OF STD. V

	Treatment (A)		<u>Total High SES (B₁)</u>
	Experimental (A ₁)	Control (A ₂)	
	A ₁ B ₁	A ₂ B ₁	
	n	25	50
High level of SES (B ₁)	ΣX	916	1537
	ΣX^2	34304	50535
	\bar{X}	36.64	30.74
SES (B)	A ₁ B ₂	A ₂ B ₂	<u>Total of Low SES (B₂)</u>
	n	25	50
Low level of SES (B ₂)	ΣX	594	1117
	ΣX^2	15082	26573
	\bar{X}	23.76	22.34
	Total of Experi- mental (A ₁)	Total of Con- trol (A ₂)	Grand total
	n	50	100
	ΣX	1510	2654
	ΣX^2	49386	77108
	\bar{X}	30.20	26.54

On the basis of the statistical figures furnished in table 8.31, multi-way analysis of variance was worked out. The summary of the multi-way analysis of variance is presented in table 8.32.

Table 8.32
SUMMARY OF MULTI-WAY ANALYSIS OF VARIANCE
OF READING COMPREHENSION SCORES OF PUPILS
OF STD. V.

Source of variation	Sums of squares	d.f.	Mean squares	F
<u>Main effects</u>				
Treatment (Experimental & Control) (A) :	1339.56	1	1339.56	41.95**
SES (B)	1764.00	1	1764.00	55.25**
<u>Interaction effect</u>				
Treatment x SES (A x B) :	501.76	1	501.76	15.71**
Error (within) :	3065.52	96	31.93	
Total	6670.84	99		

With d.f. 1 and 96 F .05 = 3.95 and F .01 = 6.92

** P < .01

It is observed from table 8.32, that F ratio of treatment exceeds the table value of F at .01 level of significance. Hence the difference between the treatments is significant. Consequently the hypothesis no. 1 is rejected, and could be inferred that there is main effect of treatment on reading comprehension abilities. The mean of the experimental group is 30.20 and the mean of the control treatment is 22.88. The mean difference is of 7.32 which is in favour of the experimental treatment i.e. the reading improvement programme treatment. Hence it could be said that of the two, the reading improvement programme treatment is superior to the control treatment in developing the reading comprehension abilities of students of Std. V.

It is also observed from table 8.32 that the obtained F ratio of SES exceeds the table value of F at .01 level of significance. Hence the mean difference between groups of the two levels of SES is significant. Consequently the null hypothesis no. 2 is rejected, and could be inferred that there is a main

effect of SES on the reading comprehension abilities. The mean difference between the high level and low level groups is 8.4 which is in favour of high level SES group. Hence it could be said that of the two groups based on SES levels, the students coming from high socio-economic level are benefitted more in the development of reading comprehension abilities.

It is also observed from table 8.32 that the obtained F ratio of interaction between treatment and SES exceeds the table value of F at .01 level of significance. Hence the interaction effect of the two independent variables on the development of reading comprehension abilities is significant. Consequently the null hypothesis no. 3 is rejected.

In order to study the interaction effect in detail, Duncan's New multiple range test was worked out. The comparison of means of the four groups is presented in table 8.33.

Table 8.33

SUMMARY OF DUNCAN'S NEW MULTIPLE RANGE TEST SHOWING COMPARISON OF MEANS OF READING COMPREHENSION ABILITIES OF STUDENTS OF STD. V OF FOUR GROUPS

Descript- tion of groups	Control Low SES	Control High SES	Experi- mental Low SES	Experi- mental High SES	Shortest signifi- cant ranges <u>.05</u>	<u>.01</u>
Serial 1	2	3	4			
Symbol of groups	A ₂ B ₂	A ₂ B ₁	A ₁ B ₂	A ₁ B ₁		
Means	20.92	23.76	24.84	36.64		
A ₂ B ₂	20.92	-	2.84	3.92*	15.72**	R ₂ =3.20 R ₂ =4.25
A ₂ B ₁	23.76	-	-	1.08	12.88**	R ₃ =3.36 R ₃ =4.43
A ₁ B ₂	24.84	-	-	-	11.80**	R ₄ =3.47 R ₄ =4.56

$$S = \sqrt{MSW} = \sqrt{31.93} = 5.65$$

$$\bar{Sx} = \frac{3}{\sqrt{N}} = \frac{5.65}{\sqrt{25}} = 1.13 \quad ** \quad P < .01$$

* P < .05

It is observed from table 8.33 that the mean difference between A₁B₁ and A₂B₂ is of 15.72 which is significant and is in favour of A₁B₁, the mean difference between A₁B₁ and A₂B₁ is of 12.88 which is significant at .01 level and in favour of A₁B₁, and the mean difference between A₁B₁ and A₁B₂ is of 11.80 which is significant at .01 level and in favour of A₁B₁. Hence it

could be concluded that the combination of experimental treatment with high SES yields the highest result.

It is also observed from table 8.33, that the mean difference between A_1B_2 and A_2B_2 is of 3.92 which is significant at .05 level and in favour of A_1B_2 . It is observed that level of low SES is the same in both the groups but level of treatment is not the same. The mean difference is in favour of experimental treatment.

It is observed that the mean difference between A_1B_2 and A_2B_1 is of 1.08 which is not significant at .05 level. Hence it could be said that both the groups are same in their mean performance. The levels of both the groups are crossing each other. Hence due to this crossing the effect of each other is nullified.

It is also observed that the mean difference between A_2B_1 and A_2B_2 is of 2.84 which is also not significant. Hence both the groups are equal. Here the treatment is the same but level of SES is different. Same treatment but level is different in experiment yields significant difference but here this pattern is not observed. Consequently it could be said that it is due to the significant interaction between the two independent variable.

(ii) Impact of Reading Improvement Programme on Reading Comprehension of pupils of Std. VI in the context of SES

The analysis of observations was carried out to test the following hypotheses of the study :

Hypotheses

- i. There is no main effect of Treatment (A) on the development of reading comprehension abilities.
- ii. There is no main effect of SES (B) on the development of reading comprehension abilities, and
- iii. There is no interaction effect of taking place between Treatment (A) and SES (B) on the development of reading comprehension abilities.

From the scores on criterion tests (final test) of reading comprehension abilities of the four groups as discussed earlier about the procedure of the study, the primary statistics, necessary for multi-way analysis of variance was worked out to study the hypotheses. It is presented in table 8.34.

Table 8.34

$\sum X$, $\sum X^2$, \bar{X} AND n ON OBSERVATIONS ON THE SCORES OF READING COMPREHENSION ABILITIES OF FOUR GROUPS FORMED ON TWO LEVELS OF TREATMENT (A) AND SES (B) OF STD.VI

		Treatment (A)		Total High SES (B ₁)
		Experimen- tal (A ₁)	Control (A ₂)	
		A ₁ B ₁	A ₂ B ₁	
High level of SES (B ₁)	n	25	25	50
	$\sum X$	967	619	1586
	$\sum X^2$	40435	17839	58274
	\bar{X}	38.68	24.76	31.72
SES (B)		A ₁ B ₂	A ₂ B ₂	Total of Low SES (B ₂)
	n	25	25	50
	$\sum X$	633	499	1132
	$\sum X^2$	18157	11741	28898
	\bar{X}	25.32	19.96	22.64
	Total Experi- mental (A ₁)		Total of Control (A ₂)	Grand Total
	n	50	50	100
	$\sum X$	1600	1118	2718
	$\sum X^2$	58592	28580	87172
	\bar{X}	32.00	22.36	27.18

On the basis of the statistical figures furnished in table 8.34, multi-way analysis of variance was worked out. The summary of the multi-way of analysis of variance is presented in table 8.35.

Table 8.35

SUMMARY OF MULTI-WAY ANALYSIS OF VARIANCE OF
 READING COMPREHENSION SCORES OF PUPILS OF STD.
 VI

Source of variation	Sums of squares	d.f.	Mean squares	F
<u>Main effects</u>				
Treatment (Experimental & Control) (A) :	2323.24	1	2323.24	26.38**
SES (B)	2061.16	1	2061.16	23.40**
<u>Interaction effects</u>				
Treatment x SES (A x B) :	457.96	1	457.96	5.20*
Errors (within)	8454	96	88.07	
Total	13296.76	99		

With d.f. 1 and 96 F .05 = 3.95 and F .01 = 6.92

** P < .01

* P < .05

The study of the table 8.35 reveals that the obtained F ratio of the main effect of treatment exceeds the value of F at .01 level of significance. Hence the difference between two treatments is significant. Consequently the null hypothesis no. 1 of the study is rejected and could be concluded that there is the main effect of treatment on the development of reading comprehension abilities. The mean difference between the two treatments is of 9.64 which is in favour of the experimental treatment i.e. reading improvement programme treatment. Hence it could be concluded that the experimental treatment has proved superior to the control treatment in the development of reading comprehension abilities of pupils of Std. VI.

It is also observed from table 8.35 that the obtained F ratio of the main effect of SES exceeds the table value of F at .01 level of significance. Hence the mean difference between SES groups is significant. Therefore the null hypothesis no. 2 of the study is rejected, and this led to conclude that there is the main effect of SES on development of reading comprehension abilities. The mean difference between the two levels of SES is of 9.08 which is in favour of the high level of SES group. Hence it could be said that of the two groups based on SES levels, the students of Std. VI, coming from a high level of

SES are benefitted more in the development of reading comprehension abilities than that of the students coming from low SES.

It is also observed from table 8.35, that the obtained F ratio of interaction effect between Treatment (A) and SES (B) exceeds the table value of F at .05 level of significance. Hence the interaction effect of the two independent variables on the development of reading comprehension abilities is significant. Consequently the null hypothesis no. 3 of the study is rejected.

In order to study the interaction effect in detail Duncan's New Multiple range test was worked out. The comparison of means of the four groups is presented in table 8.36.

Table 8.36

SUMMARY OF DUNCAN'S NEW MULTIPLE RANGE TEST SHOWING COMPARISON OF MEANS OF READING COMPREHENSION ABILITIES OF FOUR GROUPS OF STUDENTS OF STD. VI

Descrip- tion of groups	Control Low SES	Control High SES	Experi- mental Low SES	Experi- mental High SES	Shortest signi- ficant ranges at level
Serial	1	2	3	4	
Symbol of groups	A ₂ B ₂	A ₂ B ₁	A ₁ B ₂	A ₁ B ₁	Levels of signifi- cance
Means	19.96	24.76	25.32	38.68	.05 .01
A ₂ B ₂	19.96	-	4.8	5.36	R ₃ 5.32 R ₂ 7.07
A ₂ B ₁	24.76	-	-	.56	R ₃ 5.59 R ₃ 7.37
A ₁ B ₂	25.32	-	-	-	R ₄ 5.78 R ₄ 7.58

$$S = \sqrt{MSW} = \sqrt{88.07} = 9.3845 \quad ** P < .01$$

$$\bar{S}X = \frac{S}{\sqrt{N}} = \frac{9.3845}{\sqrt{25}} = 1.88 \quad * P < .05$$

Study of table 8.36 reveals that the mean difference between A₁B₁ and A₂B₂ is 18.72 which is significant and in favour of A₁B₁, the mean difference between A₁B₁ and A₂B₁ is 13.92 which is significant and in favour of A₁B₁, and the mean difference between A₁B₁ and A₁B₂ is 13.36 which is in favour of A₁B₁. Hence it could be concluded that the combination of experimental treatment with high level of SES has proved superior to other grades in the development of reading comprehension abilities.

The mean difference between A_1B_2 and A_2B_2 is of 5.36 which is significant at .05 level of significance and in favour of A_1B_2 groups. Hence it could be concluded that the experimental treatment even with low SES is significantly more effective than the control treatment with low SES on the development of reading comprehension abilities.

The mean difference of .56 between A_1B_2 and A_2B_1 is not significant at any level of significance. Hence it could be said that experimental treatment given to the students of low SES level or control treatment given to the students of high SES is just the same.

The mean difference of 4.8 between A_2B_1 and A_2B_2 is not significant at any level of significance. Hence it could be said that the control treatment given to the students of high SES level or the control treatment given to the students of low SES level do not differ significantly. However apparent difference of 4.8 between the groups is in favour of high SES students with the control treatment. This has happened because both the variables interact significantly and leave their effect on the development of reading comprehension abilities of students of Std. VI.

(iii) Impact of Reading Improvement Programme on Reading Comprehension of pupils of Std. VII in the Context of SES

The analysis of observations was carried out to test the following null hypotheses of the study:

Hypotheses:

- i. There is no main effect of treatment (A) on the development of reading comprehension abilities.
- ii. There is no main effect of SES (B) on the development of reading comprehension abilities, and
- iii. There is no interaction effect taking place between treatment (A) and SES (B) on the development of reading comprehension abilities.

From the analysis on criterion tests (final test) of reading comprehension abilities of the four groups as discussed in

earlier about the procedure of the study, the primary statistics, necessary for multi-way analysis of variance was worked out to study the hypotheses. It is presented in tabl. 8.37.

Tabl. 8.37

$\langle X \rangle$, $\langle X^2 \rangle$, \bar{X} AND n ON OBSERVATIONS ON THE SCORES OF READING COMPREHENSION ABILITIES OF FOUR GROUPS FORMED ON TWO LEVELS OF TREATMENT (A) AND SES (B) OF STD. VII

		Treatment (A)		Total High SES (B ₁)
		Experimental (A ₁)	Control (A ₂)	
		A ₁ B ₁	A ₂ B ₁	
High SES (B ₁)	n	25	25	50
	$\sum X$	1037	806	1843
	$\sum X^2$	46919	31978	78897
	\bar{X}	41.48	32.24	36.86
SES (B)		A ₁ B ₂	A ₂ B ₂	Total of Low SES (B ₂)
	n	25	25	50
	$\sum X$	712	543	1255
	$\sum X^2$	24062	13055	37117
		\bar{X}	28.48	21.72
				25.10
		Total of Experimental (A ₁)	Total of Control (A ₂)	Grand total
		n	n	
		50	50	100
		$\sum X$	$\sum X$	3098
		$\sum X^2$	$\sum X^2$	116014
		\bar{X}	\bar{X}	30.98

On the basis of the statistical figures furnished in tabl. 8.37, multi-way analysis of variance was worked out. The summary of the multi-way of analysis of variance is presented in table 8.38.

Table= 8.38

SUMMARY OF MULTI-WAY ANALYSIS OF VARIANCE OF
READING COMPREHENSION SCORES OF PUPILS OF STD. VII

Source of variation	Sum of squares	d.f	Mean squares	F
<u>Main effects</u>				
Treatment (Experimental & Control (A) :	1600.00	1	1600.00	10.28**
SES (B)	3457.44	1	3457.44	22.13**
<u>Interaction effect</u>				
Treatment x SES (AxB) :	38.44	1	38.44	.25 NS
Errors (within)	14942.08	96	155.65	
Total	20037.96	99		

With d.f. 1 and 96 F .05 = 3.95 and F .01 = 6.92

** P < .01

N.S. : P < .05

It is observed from table 8.38, that the obtained F ratio of the main effect of treatment exceeds the table value of F at .01 level of significance. Hence the difference between the two treatments is significant. Consequently, the null hypothesis no. 1 of the study is rejected and concluded that there is the main effect of the treatment on the development of reading comprehension abilities. The mean difference between the two treatments is c.00 which is in favour of the experimental treatment i.e. reading improvement programme treatment. Hence it could be positively concluded that the experimental treatment is superior to the control treatment in the development of reading comprehension abilities of students of Std. VII.

It is also observed from table 8.38, that the obtained F ratio of the main effect of SES exceeds the table value of F at .01 level of significance. Hence the mean difference between groups of SES levels is significant. Consequently the null hypothesis no. 2 of the study is rejected, and it is observed that the main effect of SES on the development of reading comprehension abilities. The mean difference between the two levels of SES is of 12.76 which is in favour of the high level of a group. Hence it could be said that at the two groups based on SES levels, the students of Std. VII

coming from a high level of SES have proved superior in the development of reading comprehension abilities to their counterpart.

It is also observed from table 8.38, that the obtained F ratio of interaction effect between treatment (A) and SES (B) does not reach the table value of " at any significant level. Hence the interaction effect of the two independent variables on the development of reading comprehension abilities is not significant. Consequently the null hypothesis no. 3 of the study is accepted.

In order to study the situation of the non-interaction effect in detail the Duncan's New Multiple Range Test was worked out. The comparison of means of the four groups is presented in table 8.39.

Table 8.39

SUMMARY OF DUNCAN'S NEW MULTIPLE RANGE TEST SHOWING COMPARISON OF MEANS OF READING COMPREHENSION ABILITIES OF FOUR GROUPS OF STUDENTS OF STD. VII

Serial	Low SES		High SES		Significant range at levels
	mental	SES	mental	SES	
Symbol of groups	A ₂ B ₂	A ₁ B ₂	A ₂ B ₁	A ₁ B ₁	
Means	21.72	28.46	32.74	41.48	.05 .01
A ₂ E ₂ 21.72	-	6.76	10.52**	19.76**	R ₂ 7.08 R ₂ 9.40
A ₁ B ₂ 28.46	-	-	3.76 NS	13.00**	R ₃ 7.45 R ₃ 9.80
A ₂ B ₁ 32.74	-	-	-	9.24*	R ₄ 7.68 R ₄ 10.08

$$S = \sqrt{MSW} = \sqrt{155.65} = 12.48 \quad ** \quad P < .01 \quad N.S. \quad P > .05$$

$$\widehat{Sx} = \frac{S}{\sqrt{N}} = \frac{12.48}{\sqrt{25}} = 2.50 \quad * \quad P < .05$$

reveals

From study of table 8.39 that the mean difference between A₁B₁ and A₂E₂ is of 19.76 points which is significant at .01 level of significance in the favour of A₁B₁, the mean difference between A₁B₁ and A₁B₂ is of 13.00 points which is also significant at .01 level of significance and is in favour of A₁B₁ and the mean difference between A₁B₁ and A₂B₁ is of 9.24 which is

significant at .05 level of significance and is in favour of A_1B_1 . Hence it could be inferred that the combination of experimental treatment with the high level of SES could effect all in the development of reading comprehension abilities.

The mean difference between A_2B_1 and A_2B_2 is of 10.52 which is significant at .01 level of significance and in the favour of A_2B_1 . Hence it could be inferred that the treatment level is the same but level of SES is different. So high level of SES does play a significant role in the development of reading comprehension abilities.

The mean difference between A_1B_2 and A_2B_2 is not significant and the mean difference between A_2B_1 and A_1B_2 is also not significant. Hence it could be inferred that inter mixture of the levels make them equal in the development of reading comprehension abilities.

The different levels of the same variable but the same level of the other variable help to develop the reading comprehension abilities. Hence it could be inferred that there is no interaction effect on it and the general pattern of two variables seem to pull in the same direction to develop the reading comprehension abilities of the students of Std. VII.

Studies on Impact of Reading Improvement Programme on Rate of Reading in the Context of SES

Introduction

In the studies on treatment of reading improvement programme for development of rate of reading (R.R.) in the context of SES for Stds. V, VI and VII, the following procedure was adopted to find out main as well as interaction effects of the treatment and SES, independent variables on the development of rate of reading through reading improvement programme treatment.

Procedure

In the studies on rate of reading development through reading improvement programme, there are two independent variables namely Reading Improvement Programme Treatment and SES. To study the main as well as interaction effects on the development of rate of reading through the reading improvement programme, the factorial design was contemplated. The importance of the factorial design has already been discussed in the procedure of studies of reading improvement programme developing reading comprehension in the context of SES.

As per requirement to divide each independent variable into convenient levels, the treatment variable was divided into two levels namely Reading Improvement Programme Treatment as Experimental treatment and non-Reading Improvement Programme as control treatment, and the SES variable was divided into two levels namely high SES and low SES on the basis of Q measure. As these variables are divided into two distinct levels, a 2×2 factorial design emerged. Thus the sample was divided into four groups as follows :

- i. Experimental with high SES
- ii. Experimental with low SES
- iii. Control with high SES, and
- iv. Control with low SES

In each of the above defined groups, 25 observations were randomly selected on rate of reading per minute. The studies are presented one after the other.

(i) Impact of Reading Improvement Programme of Std. V on Rate of Reading in the context of SES

on pupils

The analysis of observations was carried out to test the following null hypotheses of the study :

Hypotheses

- i. There is no main effect of Treatment (A) on the development of Rate of Reading.
- ii. There is no main effect of SES on the development of Rate of Reading.

iii. There is no interaction effect taking place between treatment (A) and SES (B) on the development of Rate of Reading.

From the words read per minute on criterion test (final test) of the four groups as discussed earlier about the procedure of the study, the primary statistics, necessary for multi-way analysis of variance was worked out to study the hypotheses. It is presented in table 8.40.

Table 8.40

$\sum X$, $\sum X^2$, \bar{X} AND N OF OBSERVATIONS ON THE RATE OF READING PER MINUTE OF FOUR GROUPS FORMED ON TWO LEVELS OF TREATMENT (A) AND SES (B) OF PUPILS OF STD. V

		Treatment (A)		Total of high SES (B_1)
		Experimen- tal (A_1)		
		$A_1 B_1$	$A_2 B_1$	
High SES (B_1)	n	25	25	50
	$\sum X$	4093	2976	7069
	$\sum X^2$	725345	381618	1106963
	\bar{X}	163.72	119.04	141.38
SES (B)	$A_1 B_2$	$A_2 B_2$	Total of low SES (B_2)	
	n	25	25	50
	$\sum X$	3034	2710	5744
	$\sum X^2$	384620	312640	697260
	\bar{X}	121.36	108.40	114.88
	Total of Experimen- tal (A_1)	Total of Control (A_2)	Grand Total	
	n	50	50	100
	$\sum X$	7127	5686	12813
	$\sum X^2$	1109965	694258	1804223
	\bar{X}	142.54	113.72	128.13

On the basis of the statistical figures furnished in table 8.40, multi-way analysis of variance was worked out. The summary of the multi-way analysis of variance is presented in table 8.41.

Table 8.41

SUMMARY OF MULTI-WAY ANALYSIS OF VARIANCE OF
 DEVELOPMENT OF RATE OF READING PER MINUTE OF
 PUPILS OF STD. V

Source of variation	Sum of squares	d.f.	Mean squares	F
<u>Main effects</u>				
Treatment (Experimental & Control)(A) :	20764.81	1	20764.81	16.91**
SES (B)	17556.25	1	17556.25	14.30**
<u>Interaction effect</u>				
Treatment x SES (A x B) :	6288.49	1	6288.49	5.12*
Errors (Within) :	<u>117883.76</u>	<u>96</u>	1227.96	
Total	162493.31	99		

With d.f. 1 and 95 F .01 = 3.95 and F .01 = 6.92

** P < .01

* P < .05 .

It is observed from table 8.41, that the obtained F ratio of the main effect of treatment exceeds the table value of ^b at .01 level of significance. Hence the difference between two treatments is significant. Therefore the null hypothesis no. 1 of the study is rejected and concluded that there is the main effect of the treatment on the development of rate of reading. The mean difference between two treatments is of 28.82 words per minute which is in favour of the experimental treatment i.e. reading improvement programme treatment. Hence it could be concluded without any hesitation that the experimental treatment is superior to the control treatment in the development of rate of reading of students of Std. V.

It is also observed from table 8.41, that the obtained F ratio of the main effect of SES exceeds the table value of F at .05 level of significance. Hence the mean difference between two groups of SES is significant. Consequently the null hypothesis no. 2 of the study is rejected, and is concluded that there is the main effect of SES on the development of rate of reading. The mean difference of 26.50 words per minute which is in favour of high level SES group. Hence it could be said that of the two groups, based on SES levels, the

students of Std. V coming from high level of SES are much benefitted by reading improvement programme in rate of reading per minute.

It is also observed from table 8.41 that the obtained F ratio of interaction between treatment (~) and SES (B) exceeds the table value of F at .05 level of significance. Hence the interaction effect of the two independent variables in the development of rate of reading is significantly effective. Consequently the null hypothesis no. 3 is rejected.

In order to study the interaction situation in detail the Duncan's New Multiple Range Test was worked out. The comparison of means of the four groups is presented in table 8.42.

Table 8.42

SUMMARY OF DUNCAN'S NEW MULTIPLE RANGE TEST SHOWING COMPARISON OF MEANS OF RATE OF READING PER MINUTE OF FOUR GROUPS OF STUDENTS OF STD. V.

Descrip- tion of groups	Control Low SES	Control High SES	Experi- mental Low SES	Experi- mental High SES	Shortest signi- ficant range at levels
Serial	1	2	3	4	
Symbol of groups	A ₂ B ₂	A ₂ B ₁	A ₁ B ₂	A ₁ B ₁	
Means	108.40	119.04	121.36	163.72	.05 .01
A ₂ B ₂ 108.40	-	10.64	12.96	.55.32** R ₂	19.62 R ₂ 26.10
A ₂ B ₁ 119.04	-	-	2.32	44.68** R ₃	20.64 R ₃ 27.20
A ₁ B ₂ 121.36	-	-	-	42.36** R ₄	21.32 R ₄ 27.96

$$S = \sqrt{MSW} = \sqrt{1202.89} = 34.68 \quad ** \quad P < .01$$

$$\bar{S} = \frac{S}{N} = \frac{34.68}{25} = \frac{34.68}{5} = 6.9365 \text{ N.S.} \quad P < .05 \\ \text{N.S. } P > .05$$

It is observed from table 8.42, that the mean difference between A₁B₁ and A₂B₂ is of 55.32 R.R. per minute which is significant at .01 level of significance and in favour of A₁B₁, the mean difference between A₁B₁ and A₂B₁ is of 44.68 R.R. per minute which is also significant at .01 level of significance and in favour of A₁B₁, and the mean difference

between A_1B_1 and A_1B_2 is of 42.36 R.R. per minute which is also significant at .01 level of significance and in favour of A_1B_1 group. Hence it could be inferred that the combination of experimental treatment with high level of SES could affect the most of all combinations on the increase of R.R. P.M.

The mean difference between A_1B_2 and A_2B_2 is not significant and the mean difference between A_1B_2 and A_2B_1 is also not significant. Hence experimental treatment with low SES does not surpass the control treatment either with high SES level or low SES level. This is only possible when interaction between two variables is taking place. Hence experimental treatment functions effectively only when it is given to the students of high SES level.

(ii) Impact of Reading Improvement Programme on pupils of Std. VI on Rate of Reading in the context of SES.

The analysis of observations was carried out to test the following hypotheses of the study :

Hypotheses

- i. There is no main effect of treatment (A) on the development of Rate of Reading.
- ii. There is no main effect of SES on the development of Rate of Reading, and
- iii. There is no interaction effect taking place between treatment (A) and SES (B) on the development of Rate of Reading.

From the words read per minute on criterion test (final test) of R.R. of the four groups as discussed earlier about the procedure of the study, the primary statistics, necessary for multi-way analysis of variance was worked out to study the hypotheses. It is presented in table 8.43.

Table 8.43

$\{\bar{X}$, $\{\bar{X}^2$, \bar{X} AND N ON OBSERVATIONS OF THE RATE OF READING PER MINUTE OF FOUR GROUPS FORMED ON THE BASIS OF TWO LEVELS OF TREATMENT (A) AND SES (B) OF STUDENTS OF STD. VI

		Treatment (A)		
		Experimen-tal (A_1)	Control (A_2)	
		$A_1 B_1$	$A_2 B_1$	Total of high SES (B_1)
High SES (B_1)	n	25	25	50
	$\sum X$	4152	2711	6863
	$\sum X^2$	743020	308567	1051587
	\bar{X}	166.08	108.44	137.26
SES (B)		$A_1 B_2$	$A_2 B_2$	Total of Low SES (B_2)
	n	25	25	50
	$\sum X$	3093	2562	5655
	$\sum X^2$	402167	286638	688805
	\bar{X}	123.72	102.48	113.10
		Total of Ex-perimental (A_1)	Total of Control (A_2)	Grand total
	n	50	50	100
	$\sum X$	7245	5273	12518
	$\sum X^2$	1145187	595205	1740392
	\bar{X}	144.90	105.46	125.18

On the basis of the statistical figures furnished in table 8.43 multi-way analysis of variance was worked out. The summary of the multi-way analysis of variance is presented in table 8.44.

Table 8.44
SUMMARY OF MULTI-WAY ANALYSIS OF VARIANCE OF
DEVELOPMENT OF RATE OF READING PER MINUTE OF
STD. VI.

Source of variation	Sum of squares	d.f.	Mean squares	F
<u>Main effects</u>				
Treatment (Experimental & Control) (A) :	38887.84	1	38887.84	33.44**
<u>SES (B) :</u>				
	14592.64	1	14592.64	12.55**
<u>Interaction effect</u>				
Treatment x SES (AxB) :	8281.00	1	8281.00	7.12*
Errors (within):	111627.28	96	1162.78	
Total	173388.76	99		

With d.f. 1 and 96 F .05 = 3.95 and F .01 = 6.92

** P < .01

* P < .05

It is observed from table 8.44 that the obtained F ratio of the main effect of treatment is 33.44 which far exceeds the table value of F at .01 level of significance. Hence the difference between two treatments is significant. Therefore the null hypothesis no. 1 of the study is rejected and concluded that there is the main effect of the treatment on the development of Rate of Reading per minute. The mean difference between two treatments is of 39.44 words p.m. which is in favour of the experimental treatment i.e. Reading Improvement Programme Treatment. Hence it could be positively said that experimental treatment is superior to the control treatment in the development of rate of reading of students of Std. VI.

It is also observed from table 8.44 that the obtained F ratio of the main effect of SES exceeds the table value of F at .01 level of significance. Hence the mean difference between two groups of SES is significant. Therefore the null hypothesis no. 2 of the study is rejected, and concluded that there is the main effect of SES on the development of Rate of Reading. The mean difference of 24.16 words p.m. which is in favour of high level SES group. Hence it could be said that of the two groups, based on SES levels, the students of Std. VI

coming from high SES level are much benefitted in the development of Rate of Reading by Reading Improvement Programme.

It is also observed from table 8.44 that the obtained F ratio of interaction between treatment (A) and SES (B) exceeds the table value of F at .05 level of significance. Hence the null hypothesis no. 3 is rejected.

In order to study the interaction situation in detail the Duncan's New Multiple Range Test was worked out. The comparison of means of the four groups is presented in table 8.45.

Table 8.45

SUMMARY OF DUNCAN'S NEW MULTIPLE RANGE TEST SHOWING COMPARISON OF MEANS OF RATE OF READING PER MINUTE OF FOUR GROUPS OF STANDARD OF VI

Description of groups	Control Low SES	Control High SES	Experimental Low SES	Experimental High SES	Shortest significant range at levels
Serial	1	2	3	4	
Symbol of groups	A ₂ B ₂	A ₂ B ₁	A ₁ B ₂	A ₁ B ₁	
Means	102.48	108.44	123.72	166.08	.05 .01
A ₂ B ₂ 102.48	-	5.96 N.S.	21.24*	63.60**	R ₂ =19.095 R ₂ =25.762
A ₂ B ₁ 108.44	-	-	15.28 N.S.	57.64**	R ₃ =20.088 R ₃ =26.47
A ₁ B ₂ 123.72	-	-	-	42.36**	R ₄ =20.74 R ₄ =27.031

$$S = \sqrt{MSW} = \sqrt{1139.05} = 33.75 \quad ** \quad P < .01$$

$$\bar{S}X = \frac{S}{N} = \frac{33.75}{25} = \frac{33.75}{5} = 6.75 \quad * \quad P < .05$$

$$N.S. \quad P > .05$$

It is observed from table 8.45, that the mean difference between A₁B₁ and A₂B₂ is of 63.60 points which is significant at .01 level of significance and in favour of A₁B₁, the mean difference between A₁B₁ and A₂B₁ is of 57.64 words p.m. which is significant at .01 level of significance and in the favour of A₁B₁, and the mean difference between A₁B₁ and A₁B₂ is of 42.36 words p.m. which is significant at .01 level of significance and also in the favour of A₁B₁. Hence it could be said that the combination of experimental treatment with

high SES level has proved to be the most effective of all combinations on development of Rate of Reading per minute.

The mean difference between A_1B_2 and A_2B_2 is of 21.24 which is significantly in favour of A_1B_2 group, that is the experimental treatment with low SES. Hence students from low SES taking experimental treatment proved to be superior to those of control treatment.

The mean differences between A_1B_2 and A_2B_1 is not significant and both are equal in the sense of significance of the mean.

The mean difference between A_2B_1 and A_2B_2 is not significant and both are statistically equal. Hence the control treatment with high SES or low SES is just equal.

The discussion presented in the above two paras indicate that this has happened because there is interaction between two variables. However experimental treatment is significantly better than the control treatment.

(iii) Impact of Reading Improvement Programme on pupils of Std. VII on Rate of Reading in the Context of SES

The analysis of observations was carried out to test the following null hypotheses of the study:

Hypotheses :

- i. There is no main effect of Treatment (A) on the development of Rate of Reading.
- ii. There is no main effect of SES on the development of Rate of Reading, and
- iii. There is no interaction effect taking place between Treatment (A) and SES (B) on the development of Rate of Reading.

From the words read per minute (P.M.) on criterion test (final test) of Rate of Reading of the four groups as discussed earlier, the primary statistics, necessary for multi-way analysis of variance was worked out to study the hypotheses as mentioned above. It is presented in table 8.46.

Table 8.46

$\sum X$, $\sum X^2$, \bar{X} AND N ON OBSERVATIONS OF RATE OF READING PER MINUTE OF FOUR GROUPS FORMED ON THE BASIS OF TWO LEVELS OF TREATMENT (A) AND SES (B) OF STUDENTS OF STD. VII

		Treatment (A)		
		Exp. rimen-tal (A_1)	Control (A_2)	
		$A_1 B_1$	$A_2 B_1$	Total of high SES (B_1)
High SES (B_1)	n	25	25	50
	$\sum X$	4657	3744	8401
	$\sum X^2$	938071	590532	1528603
	\bar{X}	186.28	149.76	168.02
SES (B)	$A_1 B_2$	$A_2 B_2$	Total of Low SES (B_2)	
	n	25	25	50
	$\sum X$	3257	2739	5996
	$\sum X^2$	447241	320199	767440
	\bar{X}	130.28	109.56	119.92
	Total of Ex-pri-mental (A_1)	Total of Control (A_2)	Grand total	
	n	50	50	100
	$\sum X$	7914	6483	14397
	$\sum X^2$	1385312	910731	2296043
	\bar{X}	158.28	129.66	143.97

On the basis of the statistical figures furnished in table 8.46, multi-way analysis of variance was worked out. The summary of the multi-way analysis of variance is presented in table 8.47.

Table 8.47

SUMMARY OF MULTI-WAY ANALYSIS OF VARIANCE OF
 DEVELOPMENT OF RATE OF READING PER MINUTE OF
 PUPILS OF STD. VII

Source of variation	Sum of squares	d.f	Mean squares	F
<u>Main effects</u>				
Treatment (A) (Experimental and Control) :	20477.61	1	20477.61	13.71**
SES (B) :	57840.25	1	57840.25	38.71**
<u>Interaction effect</u>				
Treatment x SES (A x B) :	1560.25	1	1560.25	1.04 N.S.
Errors (Within) :	143428.80	96	1494.05	
Total	223306.91	99		

With d.f. 1 and 96 F .05 = 3.95 and F .01 = 6.92

** P < .01

N.S. P > .05

It is observed from table 8.47, that the obtained F ratio of the main effect of treatment is 13.71 which far exceeds the table value of F at .01 level of significance. Hence the difference between two means of treatments is significant. Therefore the null hypothesis no. 1 of the study is rejected, and concluded that there is the main effect of treatment on the increase of rate of reading per minute. The mean difference between the treatments is of 28.62 words p.m. which is in the favour of the experimental treatment i.e. Reading Improvement Programme Treatment. Hence it could be positively said that the experimental treatment is superior to the control treatment in the increase of rate of reading of students of Std. VII.

It is also observed from table 8.47 that the obtained F ratio of the main effect of SES exceeds the table value of F at .01 level of significance. Hence the mean difference between two groups of SES is significant. Consequently the null hypothesis no. 2 of the study is rejected. This led to conclude that there is the main effect of SES on the development of rate of reading. The mean difference of 48.10 words p.m. which is in favour of high level SES group. Hence it could be said that of the two groups, based on SES

levels, the students of Std. VII coming from high level of SES are benefitted in the increase of rate of reading per minute by Reading Improvement Programme.

It is also observed from table 8.47, that the obtained F ratio of interaction between treatment (A) and SES (B) does not exceed the table value of F at any level of significance. Hence the null hypothesis no. 3 is accepted.

In order to study the interaction situation in detail the Duncan's New Multiple Range Test was worked out. The comparison of means of the four groups is presented in table 8.48.

Table 8.48

SUMMARY OF DUNCAN'S NEW MULTIPLE RANGE TEST SHOWING
COMPARISON OF MEANS OF RATE OF READING PER MINUTE
OF FOUR GROUPS OF STANDARD VII

Descrip- tion of groups	Control Low SES	Experi- mental High SES	Control Low SES	Experi- mental High SES	Shortest Range at levels	signifi-
Serial	1	2	3	4		
Symbol of groups	A_2B_2	A_1B_2	A_2B_1	A_1B_1		
Means	119.92	130.28	149.76	186.28	.05	.01
A_2B_2	119.92	-	20.72 N.S.	40.20 **	76.72 **	$R_2=21.64$ $R_2=28.78$
A_1B_2	130.28	-	-	19.48 N.S.	56.00 **	$R_3=22.77$ $R_3=30.00$
A_2B_1	149.76	-	-	-	36.52 **	$R_4=23.51$ $R_4=30.84$

$$S = \sqrt{MSW} = \sqrt{1463.56} = 38.265 \quad ** \quad P < .01$$

$$\bar{S}_X = \frac{S}{\sqrt{N}} = \frac{38.265}{\sqrt{25}} = \frac{38.265}{5} = 7.65 \quad N.S. \quad P > .05$$

It is observed from table 8.48 that the mean difference between A_1B_1 and A_2B_2 is of 76.72 which is highly significant at .01 level of significance and is in favour of A_1B_1 , the mean difference between A_1B_1 and A_1B_2 is of 56.00 which is also highly significant at .01 level of significance and is in favour of A_1B_1 and the mean difference between A_1B_1 and A_2B_1 of 36.52 is which is also highly significant, and is in favour of A_1B_1 . Hence it could be inferred that the combination of experimental treatment with high SES level could

be the most effective of all the combinations on the development of Rate of Reading per minute.

The mean difference between A_2B_1 and A_2B_2 is of 40.20 which is highly significant at .01 level of significance and is in favour of A_2B_1 . Hence control treatment is more effective at high level of SES.

The mean difference between A_2B_1 and A_1B_2 is of 19.48 which is not significant at .05 level. Hence the control treatment with high SES and experimental treatment with low SES produce more or less the same effect on the development of Rate of Reading per minute.

The mean difference between A_1B_2 and A_2B_2 is of 20.72 which is not significant at .05 level, too. Hence at low level SES control and experimental treatment are ineffective.

From the above discussion it could be said that there is no interaction effect of these two variables but they seem to be pulling in the same direction jointly on the development of Rate of Reading per minute.

CHAPTER IX

OBSERVATIONS AND CONCLUSIONS

In the beginning of this report the importance of reading comprehension along with speed has been discussed, with a view to emphasizing the felt need of standardized tools to measure reading comprehension abilities and rate of reading per minute.

Out of four skills reading is the most effective from the point of view of chief instrument of collection of informations by self study taken at his own will and time. It plays a significant role in one's life in a complex society and in a man made social atmosphere. Looking to the enormous importance of this skill in every walk of life in an intellectual world it is essential to think and devise some programme which could help to enhance Reading Comprehension and reading speed in the students of later stage of primary schools who are at the terminating stage of the primary education. It is useful to both those who terminate their study at the end of this stage and go for life work and those who continue their study in the secondary stage. It could be said without any hesitation that the success of any sound method of learning depends upon the good ability of reading comprehension of pupils of any stage age and level. Therefore practice in Reading Comprehension and speed of reading be given from the early stage of education. If we accept this, it becomes imperative to have a valid and reliable tool to measure the reading comprehension and speed of reading of pupils. It is with this tool that it would be possible to judge the reading comprehension and speed of reading and also to evaluate the Reading Improvement Programme. Therefore the first main objective was to construct and standardize a tool measuring reading comprehension and speed in Gujarati. In order to develop a valid and reliable tool, it was first necessary to define very closely the term 'Reading Comprehension' which is proposed to measure. This was done by reviewing a few reading comprehension tests constructed by some experts in this field in our country as well as in foreign countries. Moreover the theory and

findings of some researches were also studied to define the terms Reading Comprehension (R.C.) abilities and speed of reading. Out of those behavioural components, the tests of reading comprehension of Stds. V, VI and VII attempt to measure the following behavioural components.

Behavioural Components of Reading Comprehension

- i. Ability to give significant details.
- ii. Ability to give sequence of events.
- iii. Ability to give caption and draw generalization.
- iv. Ability to give meaning of words and phrases.
- and v. Ability to find out the relationship of ideas.

These five components are tested through four different sub-tests in the battery for Std. V, four different sub-tests in the battery for Std. VI, and five different sub-tests in the battery for Std. VII. The selection of the test items which is considered to be the crux of the process of standardization was made carefully by applying appropriate statistical methods, to obtain the internal consistency of tests. To add to the utility value, the tests have been standardized by strictly following the principles of the test construction and standardization. The process of standardization has been described in sufficient details in this report. The reliability of the tests has been established by various methods with an objective to overcome the limitations of any one method. The validity has also been established by following general principle's of test validation. The concurrent, concept and factorial validity have been reported in this report.

In short the tests for Stds. V, VI and VII have been standardized separately on a representative sample. The percentile norms, and letter grade norms are given with a view to helping the user to interpret the test scores.

Further in this report, the preparation of Reading Improvement Programme for Stds. V, VI and VII and the construction of SES scale and keys for them have been described in greater detail. The instructions to the teachers for implementation of the Reading Improvement Programme for each standard were prepared. To find out the efficacy of

the Reading Improvement Programme in the development of Reading Comprehension and in the increase of Rate of Reading per minute (R.R. p.m.) matched group design was prepared. The teachers of the experimental group of schools were oriented with the material. The programme was implemented in three schools of rural area and three schools of the similar area were taken as the control ones. The SES measure was also used to find out the effect of Reading Improvement Programme in the context of SES. The effectiveness of Reading Improvement Programme has been studied by adopting appropriate statistical methods. During the long process of research, certain observations have been made and collected from the experimenting teachers.

Observations

While administering the tests it was found that the majority of the students were eager to go to the next test to have a ^{Peep} through a content of the reading. On the whole the material for reading in each of the sub-tests for all the tests was found interesting from the point of view of students. The students, teachers and principals were eager to know the results of the tests.

Besides this, certain observations were made during the experimental stage of the project. Some of the exercises were found to be interesting. Hence they asked for more practice over them which was politely turned down since the Reading Improvement Programme was to be implemented strictly in accordance with the instructions prepared before hand. The conclusion were drawn on the basis of analysis of the data collected through the tests at the initial stage and at the final stage of the experiments and also on SES scale administered at the end of experiment.

Conclusions

The various conclusions which are drawn as a result of this project are categorised under two different headings namely :

- i. Psychometric properties of the tests and their results.
- ii. The findings of the experiments.

1. Psychometric Properties of the Tests and Results of the Tests

(i) Reliability of the Tests

As there are three separate tests for stds. V, VI and VII, reliability of each test was separately worked out. The reliability of each test was established by using Split-half method, K.R. formula-20 and Analysis of Variance approach.

- (a) The split-half reliability of the test for Std. V is .75 and that the test for Std. VI is .823 and that of the test for Std. VII is .80 (table 5.8).
- (b) The reliability by K.R. Formula-20 of the test for Std. V is .83, the test for Std. VI is .87 and for the test for Std. VII is .89 (table 5.8), and
- (c) The reliability by Analysis of Variance approach of the test for Std. V is .83 of the test for Std. VI is .86 and of the test for Std. VII is .89 (table 5.8).

So it could be concluded that all the three tests are highly reliable.

(ii) Validity of the Tests

The validity of tests for Stds. V, VI and VII was separately established. Three types of validities for each test were established, namely construct validity, concurrent validity and factorial validity.

(a) Construct Validity

The construct validity was determined by defining the measures used in the present tests. The term reading comprehension was analysed in the terms of behavioural components such as :

- 1. ability to give details of what is read,
- 2. ability to follow the sequence of events,
- 3. ability to give caption and draw generalization,
- 4. ability to give the meaning of words or phrase, and
- 5. ability to find out relationship of ideas .

Total 52 items for Std. V, 68 items for Std. VI and 78 items for Std. VII were selected in the consultation of experts in the field (table 5.9). Thus each test measures all components of reading comprehension. Therefore it could be concluded that the tests for Stds. V, VI and VII have good construct validity.

(b) Concurrent Validity

For establishing the concurrent validity of each test separately correlation of coefficient between two sets of measures namely, Teachers' Rating and students performance on the test were worked out. The correlation coefficient between teachers' opinion and reading comprehension scores for Std. V is .43 (table 5.10). The correlation coefficient between teachers' opinion and reading comprehension scores for Std. VI is .57 (table 5.11) and the correlation coefficient between teachers' opinion and reading comprehension for Std. VII is .68 (table 5.12). These validity coefficients could be considered as sufficiently high hence the tests have good concurrent validities.

(c) Factorial Validity

(i) Factorial Validity of test for Std. V

It was found from inter-correlation matrices of Std. V that there is only one significant factor which has the highest loading in sub-test 2 which measures the ability to note significant details and ability to find out relationship between ideas (table 5.13). Test no. 3 and 4 measure the same components as well as the ability to give the meaning of the words and phrase and sequence of events. Similarly the test no. 1 measures the same components. Therefore the factor extracted significantly loaded in test no. 2 runs through all the four sub-tests. Consequently it is concluded that all the four sub-tests measure the same common factor called Reading Comprehension. This test has a good factorial validity.

(ii) Factorial Validity of test for Std. VI

It was found from inter-correlation matrices of Std. VI that there is only one significant factor which has the highest loading in sub-test no. 2 (table 5.16) which

measures the ability to note significant details, ability to give meaning of the words, ability to find out the relationship between ideas, ability to give caption and ability to give sequence of events. Similarly the sub-tests no. 3 and 4 measure the same components as well as the ability to give meaning of the words and phrase. Similarly sub-test no. 1 measures the same components. The common components found is present in all the four sub-tests which belongs to reading comprehension. Hence it is concluded that all the sub-tests measure the same common factor called reading comprehension. The test has a good factorial validity.

(iii) Factorial Validity of test for Std. VII

It was found from the inter-correlations matrices of Std. VII that there is only one significant factor which has the highest loading in sub-test no. 3 (table 5.19) which measures the ability to give significant details, ability to give the meaning of the words, ability to find out the relationship between ideas and ability to give the sequence of events. Similarly the sub-tests no. 2, 4 and 1 measure the same components as well as the ability to give caption. Sub-test no. 5 measures the word and phrase meaning. Therefore it could be said that there is only one common factor running through all the sub-tests which is called reading comprehension. Thus it is concluded that there is one common component loaded in all the five sub-tests. Hence test for Std. VII has a good factorial validity.

Hence it is finally concluded that all the three Reading Comprehension tests for standards V, VI and VII have one common factor running through all the sub-tests of each test known as Reading Comprehension. Hence it is unhesitatingly concluded that all the three tests have good factorial validity.

(d) The Results of the Tests

- i. The final run of the test was carried out on the sample of 436, 408 and 418 for Std. V, VI and VII respectively (table 4.1). The tests were administered on the sample which comprised boys and girls in proportion of 63:37, 65:35; 67:33 in Stds. V, VI and VII

respectively (table 4.1). The proportion of boys and girls in the sample of each std. is quite in accordance with the available rural pattern of proportion of sexes.

- ii. The mean score of reading comprehension of std. V is of 23.66 and an S.D. is of 7.02, the mean score of reading comprehension of std. VI is of 27.38 and on S.D. is of 9.60. The mean score of reading comprehension of std. VII is of 36.57 and an S.D. of 12.55 (table 4.2).
- iii. The mean difference of reading comprehension between boys and girls of std. V is of .78 which is not significant in favour of any sex group (table 4.3). The mean difference between boys and girls of std. VI is of 1.61 which is also not significantly in favour of any sex group (table 4.3). The mean difference of reading comprehension between boys and girls of std. VII is of 2.39 which is also not significantly in favour of any sex group (table 4.3). Hence it is concluded that there are no sex differences in reading comprehension of students of standards V, VI and VII.
- iv. The norms for reading comprehension scores of the whole sample of stds. V, VI and VII, have been established and there was no need of giving separate norms for boys and girls.
- v. The mean of words read per minute of std. V is of 101.70 and an S.D. is of 33.19. The mean of words read per minute of std. VI is of 143.03 and on S.D. of 47.31. The mean of words read per minute of std. VII is of 155.82 and an S.D. is of 43.80. (table 4.5).
- vi. The mean difference of words read per minute between boys and girls of Std. V is of 3.33 words which is not significant in favour of either sex (table 4.6). The mean difference of words read per minute between boys and girls of std. VI is of 5.33 words which is not significant in favour of either sex (table 4.6).

The mean difference of words read per minute between boys and girls of std. VII is of 7.49 which is not significant in favour of either sex (table 4.6). Hence it is concluded that there are no sex differences with regard to speed of reading.

- vii. As the mean differences of any standards on speed of reading between sexes are not significant, no separate norms for rate of reading have been established. Hence the letter grade norms of words read per minute of each standard have been established (table 4.7).

2. The findings of the Experiments

(a) Matching of Experimental and Control groups on Reading Comprehension

The experimental and control groups of all the standards were fully matched on mean and variances of reading comprehension scores. The F ratio of .98 for std. V (table 8.2), the F ratio of .11 for std. VI (table 8.4) and the F ratio of .33 for std. VII (table 8.6) are highly insignificant. Hence it is concluded that the experimental and control groups of stds. V, VI and VII were equal on reading comprehension at the initial stage of the experiment.

(b) Matching of Experimental and Control groups on Rate of Reading per minute

The experimental and control groups of all the standards were fully matched on mean and variances of Rate of Reading per minute (R.R. p.m.). The F ratio of .68 for Std. VI (table 8.10), and the F ratio of .32 for Std. VII (table 8.12) are highly insignificant. Hence it is concluded that the experimental and control groups of stds. V, VI and VII were equal on Rate of Reading per minute at the initial stage of the experiment.

(c) Impact of Reading Improvement on pupils of Std. V on Reading Comprehension

The adjusted mean score of reading comprehension (R.C.) of pupils of class V of experimental group is of 27.71 and

that of the pupils of class V of control group is of 24.76. And the difference is highly significant. (table 8.15). Therefore it is concluded that the treatment of Reading Comprehension (Reading Improvement Programme) given to the pupils of experimental group has proved itself significantly more effective than the treatment of reading comprehension given to the pupils of control group.

(d) Impact of Reading Improvement Programme on pupils of Std. VI on Reading Comprehension

The adjusted mean score of reading comprehension of pupils of class VI of the experimental group is of 40.80 and that of pupils of class VI of the control group is of 27.61. And the difference between them is highly significant (table 8.18). Therefore it is concluded that the treatment of reading comprehension (reading improvement programme) given to the pupils of the experimental group has proved itself significantly more effective than the treatment of reading comprehension given to the pupils of the control group.

(e) Impact of Reading Improvement Programme on pupils of Std. VII on Reading Comprehension

The adjusted mean score of reading comprehension of pupils of class VII of the experimental group is of 43.98 and that of pupils of class VII of the control group is of 38.13. And the difference between them is highly significant (table 8.21). Therefore it is concluded that the treatment of Reading Comprehension (Reading Improvement Programme) given to the pupils of the experimental group has proved itself significantly more effective than the treatment of reading comprehension given to the pupils of control group.

(f) Impact of Reading Improvement Programme on pupils of Std. V on Rate of Reading per minute.

The adjusted mean of Rate of Reading per minute (R.R.p.m.) of pupils of class V of the experimental group is 127.12 and that of pupils of class V of the control group is 102.02. And the difference between them is highly significant (table 8.24). Therefore it is concluded that the treatment of speed of Reading Improvement Programme given to the pupils of the experimental group has proved itself significantly more

effective than the treatment of speed of reading given to the pupils of the control group.

(g) Impact of Reading Improvement Programme on pupils of Std. VI on Rate of Reading per minute

The adjusted mean of rate of reading per minute of pupils of class VI of the experimental group is 170.87 and that of pupils of Class VI of the control group is 143.56. And the difference between them is highly significant (table 8.27). Therefore it is concluded that the treatment of speed of reading (Reading Improvement Programme) given to the pupils of the experimental group has proved itself significantly more effective than the treatment of Speed of Reading given to the pupils of the control group.

(h) Impact of Reading Improvement Programme on pupils of Std. VII on Rate of Reading per minute

The adjusted mean of Rate of Reading per minute of pupils of class VII of the experimental group is of 186.60 and that of pupils of class VII of the control group is of 155.23. And the difference between them is highly significant (table 8.30). Therefore it is concluded that the Reading Improvement Programme treatment for the increasing the Rate of Reading per minute has proved itself significantly more effective than the treatment given to the students of the control group.

(i) Impact of Reading Improvement Programme on pupils of Std. V in the context of SES on Reading Comprehension

The main effect of treatment as an independent variable is highly significant on the development of reading comprehension of pupils of std. V (table 8.32). The mean difference between the two treatments is of 7.32 which is significantly in favour of the experimental group i.e., Reading Improvement Programme (tables 8.31 and 8.32). Hence it could be concluded that the Reading Improvement Programme Treatment given to students of std. V is significantly effective in the development of Reading Comprehension in the pupils even when they are not matched on any controlling variables.

The main effect of SES as an independent variable is also highly significant on the development of Reading Comprehension of pupils of Std. V (table 8.332). The mean difference between high SES level and low SES level is 8.4 which is significantly in favour of the high level and SES (tables 8.31 and 8.32). Hence it could be concluded that the students coming from the high level of SES are found evidently superior in Reading Comprehension to their counterparts. Hence it could be further concluded that SES could be an effective control variable in the development of Reading Comprehension of pupils of Std. V.

Both independent variables are equally effective on Reading Comprehension, if they are allowed to function separately. If they are taken together they confound with each other significantly (table 8.32). The mean difference between the students with low SES level taking experimental treatment and the students with high SES level taking the non-experiment treatment is of 1.08 which is too small to be significant at .05 level of significance (table 8.33). Hence the students of both the groups are just equal in the development of Reading Comprehension.

The students belonging to low SES level and taking control treatment are found extremely poor in the development of Reading Comprehension since their mean performance is the lowest of all and lower than the combined mean (tables 8.31 and 8.33). And contrary to this, the students of high level SES taking experimental treatment are evidently found the most benefitted by Reading Improvement Programme of all, since their mean performance is the highest of all and even much higher than the combined mean (tables 8.33 and 8.31). Hence it is concluded that the Reading Improvement Programme Treatment given to pupils of Std. V remained exclusively more effective with the students coming from high SES level than the students coming from low SES level (table 8.33).

(j) Impact of Reading Improvement Programme on pupils of Std. VI in the context of SES on Reading Comprehension

The main effect of treatment as an independent variable is highly significant on the development of reading

comprehension of pupils of std. VI (table 8.35). The mean difference between the two treatments is of 9.64 points which is significantly in favour of the experimental group that is the group taking Reading Improvement Programme Treatment (tables 8.34 and 8.35). Hence it could be concluded that the Reading Improvement Programme treatment given to pupils of std. VI is significantly effective in the development of Reading Comprehension in pupils even when they are not matched on any controlling variables.

The main effect of SES as an independent variable is also highly significant on the development of Reading Comprehension of pupils of std. VI (table 8.35). The mean difference between high SES and low SES levels is of 9.08 points which is significantly in favour of the high SES level (tables 8.34 and 8.35). Hence it is quite reasonable to conclude that the students of high SES level are found evidently superior in reading comprehension to their counterparts. Hence it could be further concluded that SES could be an effective variable for the development of reading comprehension of pupils of std. VI.

Both the independent variables are equally effective on Reading Comprehension, if they are allowed to function separately. If they are taken together they confound with each other significantly (table 8.35). The mean difference between the students with low SES level taking experimental treatment and the students with high SES level taking control treatment is of .56 which is too small to be significant at .05 level of significance. (table 8.36). Therefore students of both the groups are just equal in the development of reading comprehension as there is an interaction between the two variables.

The students belonging to low SES level and taking control treatment are found extremely poor in the development of Reading Comprehension, since their mean performance is the lowest of all and lower than the combined mean (tables 8.34 and 8.36). And contrary to this, the students of high level SES taking experimental treatment evidently found the most benefitted in the development of Reading Comprehension of all, since their mean performance is the highest of all and even much higher than the combined mean

(tables 8.34 and 8.36). Hence it is concluded that the Reading Improvement Programme Treatment given to pupils of Std. VI proved exclusively more effective with the students coming from high SES level than the students coming from low SES level (table 8.36).

(k) Impact of Reading Improvement Programme on Pupils of Std. VII in the context of SES on Reading Comprehension

The main effect of treatment as on independent variable is highly significant on the development of Reading Comprehension of pupils of Std. VII (table 8.38). The mean difference between treatments is of 8.00 points which is significantly in favour of the experimental one i.e. Reading Improvement Programme (tables 8.37 and 8.38). Hence it is concluded that the Reading Improvement Programme treatment given to pupils of std. VII is significantly effective in the development of Reading Comprehension in pupils of even when they are not matched on any controlling variables.

The main effect of SES as on independent variable is also highly significant on the development of Reading Comprehension of students of std. VII (table 8.38). The mean difference between ^{two} levels is of 11.76 points which is significantly in favour of the high level SES (tables 8.37 and 8.38). Hence this led to conclude that the students of high level SES are found evidently superior in Reading Comprehension to their counterparts. Hence it is further concluded that SES could be an effective variable in the development of Reading Comprehension of pupils of std. VII.

If both the independent variables are allowed to function separately they could be equally effective on Reading Comprehension but if they are taken together they confound with each other significantly (table 8.38). The mean difference between the students with low SES level taking experimental treatment and the students with high SES level taking the non-experimental treatment is of 3.76 points which does not reach to the table value of .05 significance level (table 8.39). Hence it is concluded that the students of both the groups with such combinations are just equal in the development of Reading Comprehension.

The students belonging to low SES level and taking non-experimental treatment are found extremely poor in the development of Reading Comprehension, since their mean performance is the lowest of all and lower than the combined mean (table 8.37 and 8.39). And contrary to this, the students of high level SES taking experimental treatment are evidently found the most benefitted of all in the development of reading comprehension, since their mean performance is the highest of all and much higher than the combined mean (tables 8.39 and 8.37). Hence it is quite reasonable to conclude that the Reading Improvement Programme Treatment given to students of Std. VII proved exclusively more effective with the students coming from high SES level than the students coming from low SES level (table 8.39).

(1) Impact of Reading Improvement Programme on pupils of Std. V in the context of SES on Rate of Reading per minute

The main effect of treatment as an independent variable is highly significant on the increase of Rate of Reading per minute (R.R. p.m.) of pupils of Std. V (table 8.41). The mean difference of 28.82 between two treatments is significantly in favour of the experimental treatment i.e. Reading Improvement Programme (tables 8.40 and 8.41). Hence this led to conclude that the Reading Improvement Programme Treatment given to pupils of Std. V is significantly effective in the development of Rate of Reading per minute in pupils (even when they are not matched on any controlling variables).

The main effect of SES as an independent variable is also highly significant on the increase of Rate of Reading per minute of students of std. V (table 8.41). The mean difference of 26.5 between two levels of SES is significantly in favour of high SES level (tables 8.40 and 8.41). Hence it is concluded that the students of high level SES are found evidently superior to their counterparts in the increase of Rate of Reading per minute. Hence it is further concluded that SES is an effective variable in the increase of Rate of Reading per minute of the pupils of Std. V.

If both the independent variables are allowed to function separately, they could be equally effective on Rate of Reading per minute. But if they are taken together they confound with each other significantly (table 8.41). The mean difference between the students with low SES taking experimental treatment and the students with high SES level taking nonexperimental treatment is of 2.32 which is too small to be significant at .05 level of significance (table 8.42). Hence it is concluded that the students of both the groups wrth such combinations are just equal.

The students belonging to low SES level and taking non-experimental treatment are found extremely poor in the increase of Rate of Reading per minute, since their mean performance is the lowest of all, and lower than the combined mean (table 8.42 and 8.40). And contrary to this, the students of high level SES taking experimental treatment are evidently found the most benefitted of all in the increase of Rate of Reading per minute, since their mean performance is the highest of all and much higher than the combined mean (tables 8.42 and 8.40). Hence it is concluded that the Reading Improvement Programme Treatment given to pupils of Std. V proved exclusively more effective in increasing the Rate of Reading per minute with the students coming from high SES level than the students from low SES level (table 8.42).

(m) Impact of Reading Improvement Programme on pupils of Std. VI in the context of SES on Rate of Reading per minute

The main effect of treatment as an independent variable is highly significant on the increase of Rate of Reading per minute of pupils of Std. VI (table 8.44). The mean difference of 39.44 between two treatments is significantly in favour of the experimental treatment i.e. Reading Improvement Programme Treatment (tables 8.43 and 8.44). Hence it is concluded that the Reading Improvement Programme Treatment given to pupils of Std. VI is significantly effective in the increase of Rate of Reading per minute in pupils.

The main effect of SES as an independent variable is highly significant on the increase of Rate of Reading per minute of pupils of std. VI (table 8.44). The mean difference of 24.16 between two levels of SES is significantly in favour of high SES level (tables 8.43 and 8.44). Hence it is concluded that the students of high level SES are found evidently superior to their counterparts in the increase of Rate of Reading per minute.

If both the independent variables are allowed to function separately, they could be equally effective on Rate of Reading per minute. But if they are taken together, they confound with each other significantly (table 8.44). The mean difference between the students with low SES taking experimental treatment and the students with high SES level taking non-experimental treatment is of 15.28 which falls short to reach the value of .05 level of significance (table 8.45). Hence it could be concluded that the students of both the groups with such combinations are by and large equal.

The students belonging to low SES level and taking non-experimental treatment are found extremely poor in the increase of Rate of Reading per minute, since their mean performance is the lowest of all, and lower than the combined mean (tables 8.45 and 8.43). And contrary to this, the students of high level SES taking experimental treatment are evidently found the most benefitted of all in the increase of Rate of Reading per minute, since their mean performance is the highest of all and much higher than the combined mean (tables 8.45 and 8.43). Hence it is quite reasonable to conclude that the Reading Improvement Programme Treatment given to pupils of std. VI remained exclusively more effective with the students coming from the high SES level than the students from the low SES level (table 8.45).

(n) Impact of Reading Improvement Programme on pupils of Std. VII in the context of SES on Rate of Reading per minute

The main effect of treatment as an independent variable is highly significant in the increase of Rate of

Reading per minute of pupils of std. VII (table 8.47). The mean difference of 28.62 between two treatments is significantly in favour of the experimental treatment i.e. Reading Improvement Programme Treatment (tables 8.46 and 8.47). Hence it is concluded that the Reading Improvement Programme treatment given to pupils of Std. VII is significantly effective in the increase of Rate of Reading per minute in pupils.

The main effect of SES as an independent variable is highly significant on the increase of Rate of Reading per minute of pupils of std. VII (table 8.47). The mean difference of 45.1 between two levels of SES is significantly in favour of the high SES level (tables 8.46 and 8.47). Hence it is concluded that the students of high level SES are found evidently superior to their counterparts in the increase of Rate of Reading per minute.

As both the independent variables do not interact with each other and function independently pull in the same direction, jointly to produce their positive effect on the increase of Rate of Reading per minute of pupils of std. VII (tables 8.47 and 8.48).

Of the two, the main effect of SES is much higher than that of the treatment. Hence here high SES level plays dominant role in the increase of Rate of Reading per minute (table 8.48). The means of treatment combination with high SES level differ significantly with the same treatment combination with low SES level. (table 8.48). Hence it could be concluded that students with high SES level taking experimental treatment are far superior to their counterparts.

Educational Implications

There is a great dearth of valid tools to measure reading comprehension abilities and rate of reading of students of primary schools as well as secondary schools. The present project has produced three reliable and valid tools to measure reading comprehension abilities and rate of reading i.e. speed of reading of students of classes V, VI and VII that is upper primary stage. These tests will

be useful to the teachers working with the classes V, VI and VII and will help them to know the actual level of their students in reading comprehension abilities and speed of reading.

The second aspect of the present project was to prepare a programme to improve reading comprehension and reading speed of the students of stds. V, VI and VII. If the teachers who are concerned would care to improve the levels of achievements in school subjects they could use Reading Improvement Programme to improve Reading Comprehension abilities and speed of reading which are significantly related with the achievement of school subjects.

Through the Reading Improvement Programme (R.I.P.) teachers can improve their students reading comprehension abilities and Rate of Reading per minute. With the help of measuring tools they would precisely measure their reading comprehension abilities and speed and continue their efforts in the directions to make the students attain higher goals in the levels of achievement in the subjects. Thus the findings of the present project will go a long way in making the learners better achievers in school subjects since it has produced the most useful tools to measure reading comprehension abilities and Rate of Reading per minute and effective programmes to improve comprehension abilities and rate of reading per minute. Through extension service centres more teachers could be made aware of the need of use of such reading improvement programme and valid tools measuring the level of reading comprehension and rate of reading per minute of their students. If they are rightly made aware of such programmes and tools they could lead their students in acquiring basic skills of reading comprehension which are very helpful in self study or auto learning. The auto-learning is the need of the hour in many walks of life. In the complex society one must form a habit of a continuous learning. And reading is a handy skill to help them in their efforts in this directions.

BIBLIOGRAPHY

1. Ahuja, G.C. The Relationship between Speed and Comprehension, N.I.E. Journal, Vol. IX No. 1, Sept. 1974.
2. Amelia, Melnik (ed). Reading Today and Tomorrow. London : The University of London Press.
3. Anastasi Anne, Psychological Testing. London : The MacMillan Company Ltd., 1961.
4. Anderson, Paul S. Language Skills in Elementary English. London : MacMillan Co. N.K. Callier MacMillan Ltd. 1968.
5. Ansuya, R. The Improvement of Reading efficiency at the P.O. Level Central Institute of English and Foreign Language, Hyderabad: A project sponsored by CIEFL, 1970.
6. Ashley, R.M. Successful Techniques for Teaching Elementary Language Arts. New York : Parker Publishing Co. Inc. 1970.
7. Aukerman, Robert C. Reading in the Secondary Classroom, New York: McGraw-Hill Book Company, 1972.
8. Barb, Walter B. Educator's Guide to Personalized Reading Instruction. Englewood Cliffs, N.J.: Prentice Hall, Inc., 1961.
9. Berger, Allen & Hugo Hartig. The Reading Materials Handbook. Oskosh Wisconsin: The Academia Press, 1969.
10. Bhagatwala, J.A. Standardization of Silent Reading Tests in Gujarati for Secondary Schools. Baroda: M.S. University, 1966.
11. Bond, Guy L., and Tinker, Miles A., Reading Difficulties : Their Diagnosis and Correction. New York: Appleton Century Crofts Inc., 1953.
12. Buch, M.B. A Survey of Research in Education, Baroda: Case (Vol. I) Faculty of Education & Psychology M.S. University, 1974.

13. Buros Oscar Krisen (Ed.) The Sixth Mental Measurements Year Book. New Jersey: The Gryphon Press, 1965.
14. Carpenter and Jones. Teaching Reading College students and Adults. Reading Research Quarterly, IRA, No. 3. Vol. XII, 75-76. Summary of Investigations Relating to Reading. July 1, 1975 to June 30, 1976.
15. Carroll John, The Nature of Reading Process. Harry Singar and Robert B. Ruddell (eds.) Theoretical Models and Processes of Reading. New York: International Reading Association, 1970.
16. Center, Stella S. The Hazards of Semi Leteracy: Perspectives on English. New York : Appleton-Century Crofts, 1960.
17. Chander, T.A. Reading Disability and Socio-Economic Status. Journal of Reading, Vol. X No. 1. 1966.
18. DeBoer John J. and Dallmann Martha. The Teaching of Reading. New York : Rinehart and Winston Inc., 1964.
19. Dechant, Emerald V., Improving the teaching of Reading. Englewood Cliffs, N.J. : Prentice Hall Inc. 1964.
20. Districh, D.M. Teaching Reading to children ages 8-14. Developing Reading Comprehension. The Journal of English Language Teaching, Vol. 4. No. 2. March 1969.
21. Durrel, D.D. Improving Reading Instruction. New York : World Book Co. 1956.
22. Educational Testing Service, ETS Builds a Test, Princeton: ETS, 1959.
23. Edwards Allen L. Experimental Design in Psychological Research. New Delhi : Amerind Publishing Co. Pvt. Ltd. 1968.
24. Fry, Edward L. Teaching Faster Reading, London : Cambridge University Press, 1963.
25. Garrett, H.E. Statistics in Psychology and Education. Bombay : Vakils Feffer and Simons Pvt. Ltd. 1967.

26. Gerberich, Green Jorgensen. Measurement and Evaluation in Secondary School. New York : Longmans Green & Co. 1957.
27. Guilford, J.P. Fundamental of Statistics in Psychology and Education. New York : McGraw Hill Book Co. Inc., 1956.
28. Harris, Albert J. How to Increase Reading Ability. London : Longmans Green and Co. Ltd., 1961.
29. Heilman, Arthur, Improve Your Reading Ability. Columbus: Charles E. Merrill Books, Inc. 1963.
30. Henry P. Smith and Dechant. Psychology in Teaching Reading. Englewood Cliffs: Prentice Hall Inc., 1961..
31. Kotak, Gira, H. Construction of a Course for Increasing the Reading Proficiency of the Post High School Students of Gujarat. Ph.D. Thesis in Ed. Gujarat Uni. 1982.
32. Lewis Norman, How to Read Better and Faster. New York: Thomas Y. Crowell, Harper and Row Publishers, 1978.
33. Millers, Lyle L., Increasing Reading Efficiency. New York : Holt, Rinehart and Winston, Inc. 1970.
34. Mouly George J. Science of Educational Research. New Delhi : Eurasia Publishing House Pvt. Ltd. 1964.
35. Norman, Lewis, How to Read Better and Faster. New York: Thomas Y. Crowell, Harper and Row Publishers, 1978.
36. Otto Wayne (et) Corrective and Remedial Teaching. Boston: Houghton Mifflin Co. 1973.
37. Parekh, B.U. Construction and Standardization of a Silent Reading Test in Gujarati for Pupils of Std. IX in Gujarat. Ph.D. Thesis in Ed. Sau. Uni. 1973.
38. Patel, B.V. Construction and Standardization of a Silent Reading Comprehension Test in English for S.S.C. Pupils of Gujarat State. Ph.D. Thesis in Ed. S.P. Uni. 1971.

39. Patel, B.V. Study of Rate of Reading Comprehension and Reading Achievement in the context of Apprehension. Journal of Education & Psychology. Vol. XXXII, No. 3. Oct. 1974.
40. Popham W. James. Educational Statistics. New York : Harper & Raw Publishers, 1967.
41. Quandt Ivan J. Teaching Reading, Chicago : Rand Monelly College Publishing Co., 1977.
42. Rammerse, H.H., and Gage, N.L. A Practical Introduction to Measurement and Evaluation. Delhi : Universal Book Stall. 1967.
43. Robinson, H. Alan (Comp. and Ed.) Meeting Individual Differences in Reading. Vol. XXVI. Chicago : The University of Chicago Press. 1964.
44. Roy, Newton J. Reading in Your School. New York : McGraw Hill Book Co. 1960.
45. Russell David H., Children Learn to Read. New York: Ginn and Co., 1960.
46. Smith, Henry P., and Dechant, Psychology in Teaching Reading, Englewood Cliffs: Prentice-Hall, Inc. 1971.
47. Smith, Otto and Hansen, A Hand-book for teachers, supervisors and specialists. The School Reading Programme. Boston : Houghton Mifflin Company, 1978.
48. Spache George D., Reading in Elementary School. Boston: Allyn and Bacon Inc. 1967.
49. Spache, G.D. Towards Better Understanding. Garrad : Champion Ill., Garrad. 1963.
50. Strange Ruth and others, The Improvement of Reading, New York : McGraw Hill Book Co. Inc., 1961.
51. Stroud, James B., Robert, B. Ammons, Henry, A. Bamman, Improving Reading Ability, New York : Meredith Corporation.

52. Taylor, S.E. Frackenpohl, H., and Pettee, J.L. Grade
Level Norms for the Components of the Fundamental
Reading Skill. Huntington, N.Y. : Educational
Developmental Laboratories, Inc. Bulletin, No. 3.
1960.
53. Thorndike, Robert L., Reading Comprehension Education
in Fifteen Countries : International Studies in
Evaluation. New York : A Halstead Press Book.
197 *261/PAT*
54. Trive ~~LIBRARY & DOCUMENTATION UNIT~~ aktini Kasoti.
das and Co., 1967-68.
55. Vernon, M.D., Backwardness in Reading. London :
Syndicate of Cambridge University Press, 1960.
56. Vora, I.A. A Study of Reading Achievement in the
Context of Attitude, Anxiety and n.Ach. Seminar
Reading Competition (1976-77) N.C.E.R.T.
Award Winning Paper, 1977.
57. Williams Gray and Rogers Service, Maturity in
Reading. Chicago : The University of Chicago
Press, 1956.

